



## **DEPARTMENT OF THE INTERIOR**

### **Fish and Wildlife Service**

#### **50 CFR Part 17**

**[Docket No. FWS-R4-ES-2011-0074]**

**[4500030114]**

**RIN 1018-AX76**

### **Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Cumberland Darter, Rush Darter, Yellowcheek Darter, Chucky Madtom, and Laurel Dace**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service, designate critical habitat for the Cumberland darter (*Etheostoma susanae*), rush darter (*Etheostoma phytophilum*), yellowcheek darter (*Etheostoma moorei*), Chucky madtom (*Noturus crypticus*), and

laurel dace (*Chrosomus saylori*) under the Endangered Species Act of 1973, as amended. In total, approximately 86 river kilometers (rkm) (54 river miles (rmi)) are being designated as critical habitat for the Cumberland darter, 44 rkm (27 rmi) and 12 hectares (ha) (29 acres (ac)) for the rush darter, 164 rkm (102 rmi) for the yellowcheek darter, 32 rkm (20 rmi) for the Chucky madtom, and 42 rkm (26 rmi) for the laurel dace. The effect of this regulation is to conserve the five species' habitat under the Endangered Species Act.

**DATES:** This rule becomes effective on **[INSERT DATE 30 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**.

**ADDRESSES:** This final rule and the associated final economic analysis are available on the Internet at <http://www.regulations.gov>. Comments and materials received, as well as supporting documentation used in preparing this final rule, are available for public inspection, by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office, 446 Neal Street, Cookeville, TN 38501; telephone 931-528-6481; facsimile 931-528-7075.

The coordinates or plot points or both from which the maps are generated are included in the administrative record for this critical habitat designation and are available at <http://www.fws.gov/cookeville>, <http://www.regulations.gov> at Docket No. FWS-R4-ES-2011-0074, and at the Tennessee Fish and Wildlife Office (see FOR FURTHER INFORMATION CONTACT). Any additional tools or supporting information that we

may develop for this critical habitat designation will also be available at the Fish and Wildlife Service website and Field Office set out above, and may also be included in the preamble and/or at <http://www.regulations.gov>.

**FOR FURTHER INFORMATION CONTACT:** For information regarding the Cumberland darter, contact Lee Andrews, Field Supervisor, U.S. Fish and Wildlife Service, Kentucky Fish and Wildlife Office, J.C. Watts Federal Building, 330 W. Broadway Room 265, Frankfort, KY 40601; telephone 502–695–0468; facsimile 502–695–1024. For information regarding the rush darter, contact Stephen Ricks, Field Supervisor, U.S. Fish and Wildlife Service, Mississippi Fish and Wildlife Office, 6578 Dogwood View Parkway, Suite A, Jackson, MS 39213; telephone 601–965–4900; facsimile 601–965–4340 or Bill Pearson, Field Supervisor, U.S. Fish and Wildlife Service, Alabama Fish and Wildlife Office, 1208-B Main Street, Daphne, AL 36526; telephone 251–441–5181; facsimile 251–441–6222. For information regarding the yellowcheek darter, contact Jim Boggs, Field Supervisor, U.S. Fish and Wildlife Service, Arkansas Fish and Wildlife Office, 110 South Amity Road, Suite 300, Conway, AR 72032; telephone 501–513–4470; facsimile 501–513–4480. For information regarding the Chucky madtom or laurel dace, contact Mary Jennings, Field Supervisor, U.S. Fish and Wildlife Service, Tennessee Fish and Wildlife Office, 446 Neal Street, Cookeville, TN 38501; telephone 931–525–4973; facsimile 931–528–7075. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

**SUPPLEMENTARY INFORMATION:**

## **Executive Summary**

**Why we need to publish a rule.** Under the Endangered Species Act, any species that is determined to be an endangered or threatened species requires critical habitat to be designated, to the maximum extent prudent and determinable. Designations and revisions of critical habitat can only be completed by issuing a rule.

**This rule will designate critical habitat for the Cumberland Darter, Rush Darter, Yellowcheek Darter, Chucky Madtom, and Laurel Dace.** In total, approximately 86 river kilometers (rkm) (54 river miles (rmi)) are being designated as critical habitat for the Cumberland darter in McCreary and Whitley Counties, Kentucky, and Campbell and Scott Counties, Tennessee; 44 rkm (27 rmi) and 12 hectares (ha) (29 acres (ac)) are being designated as critical habitat for the rush darter in Etowah, Jefferson, and Winston Counties, Alabama; 164 rkm (102 rmi) are being designated as critical habitat for the yellowcheek darter in Cleburne, Searcy, Stone, and Van Buren Counties, Arkansas; 32 rkm (20 rmi) are being designated as critical habitat for the Chucky madtom in Greene County, Tennessee; and 42 rkm (26 rmi) are being designated as critical habitat for the laurel dace in Bledsoe, Rhea, and Sequatchie Counties, Tennessee.

**The basis for our action.** The Act requires that the Service designate critical habitat at the time of listing to the extent prudent and determinable. We have determined that

designation is prudent and critical habitat is determinable (see **Critical Habitat** section below).

**We prepared an economic analysis.** To ensure that we consider the economic impacts, we prepared an economic analysis of the designation of critical habitat. We published an announcement and solicited public comments on the draft economic analysis. The analysis found that the present value of the total direct (administrative) incremental cost of critical habitat designation is \$644,000 over the next 20 years assuming a seven percent discount rate. Primarily these costs are associated with consultation for water quality management activities, transportation; coal mining; oil and natural gas development; agriculture, ranching, and silviculture; dredging, channelization, impoundments, dams, and diversions; and recreation at \$10,000 (Industrial Economics, Inc. 2012).

**Peer review and public comment.** We sought comments from independent specialists to ensure that our designation is based on scientifically sound data and analyses. We invited these peer reviewers to comment on our conclusions in the critical habitat proposal. We also considered all comments and information received during the comment period.

## **Background**

It is our intent to discuss in this final rule only those topics directly relevant to the development and designation of critical habitat for the Cumberland darter, rush darter,

yellowcheek darter, Chucky madtom, and laurel dace under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*). For more information on the biology and ecology of these five fishes, refer to the final listing rule published in the **Federal Register** on August 9, 2011 (76 FR 48722). For information on the five fishes' critical habitat, refer to the proposed rule to designate critical habitat published in the **Federal Register** on October 12, 2011 (76 FR 63360). Information on the associated draft economic analysis for the proposed rule was published in the **Federal Register** on May 24, 2012 (77 FR 30988).

#### *Previous Federal Actions*

The Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace were listed as endangered species under the Act on August 9, 2011 (76 FR 48722). For the full history of previous Federal actions regarding these five species, please refer to the final listing rule (76 FR 48722). In the June 24, 2010, proposed listing rule (75 FR 36035) we determined that designation of critical habitat was prudent for all five species. However, we found that critical habitat was not determinable at the time and set forth the steps we would undertake to obtain the information necessary to develop a proposed designation of critical habitat. The proposed rule to designate critical habitat for these fishes published in the **Federal Register** on October 12, 2011 (76 FR 63360). Information on the associated draft economic analysis for the proposed rule to designate critical habitat was published in the **Federal Register** on May 24, 2012 (77 FR 30988).

#### **Species Information**

## Cumberland Darter

The Cumberland darter (*Etheostoma susanae*) is a narrowly endemic fish species, occurring in sparse, fragmented, and isolated populations in the upper Cumberland River system of Kentucky and Tennessee. The species inhabits pools or shallow runs of low to moderate gradient sections of streams with stable sand, silt, or sand-covered bedrock substrates (O'Bara 1988, pp. 10–11; O'Bara 1991, p. 10; Thomas 2007, p. 4). Thomas (2007, p. 4) did not encounter the species in high-gradient sections of streams or areas dominated by cobble or boulder substrates. Thomas (2007, p. 4) reported that streams inhabited by Cumberland darters were second to fourth order, with widths ranging from 4 to 9 meters (m) (11 to 30 feet (ft)) and depths ranging from 20 to 76 centimeters (cm) (8 to 30 inches (in)).

The Cumberland darter's current distribution is limited to 13 streams in McCreary and Whitley Counties, Kentucky, and Campbell and Scott Counties, Tennessee (Thomas 2007, pp. 11–12). Occurrences from these streams are thought to form six population clusters (Bunches Creek, Indian Creek, Marsh Creek, Jellico Creek, Wolf Creek, and Youngs Creek), which are geographically separated from one another by an average distance of 30.5 stream km (19 stream mi) (O'Bara 1988, p. 12; O'Bara 1991, p. 10; Thomas 2007, p. 3).

The primary threat to the Cumberland darter is physical habitat destruction or modification resulting from a variety of human-induced impacts such as siltation, disturbance of riparian corridors, and changes in channel morphology (Waters 1995, pp. 2–3; Skelton 1997, pp. 17, 19; Thomas 2007, p. 5). The most significant of these impacts

is siltation (excess sediments suspended or deposited in a stream) caused by excessive releases of sediment from activities such as resource extraction (e.g., coal mining, silviculture, natural gas development), agriculture, road construction, and urban development (Waters 1995, pp. 2–3; Skelton 1997, pp. 17, 19; KDOW 2006, pp. 178–185; Thomas 2007, p. 5).

#### Rush Darter

The rush darter (*Etheostoma phytophilum*) is a narrowly endemic, rare, and difficult to collect fish species in north-central Alabama. The rush darter occurs in sparse, fragmented, and isolated populations. The species is currently known from tributaries and associated spring systems of the Turkey Creek (Jefferson County), Clear Creek (Winston County), and Little Cove-Bristow Creek watersheds (Etowah County). Most of these tributaries contain sites with intact physical characteristics such as riffles, runs, pools, transition zones, and emergent vegetation. Rush darters prefer springs and spring-fed reaches of relatively low-gradient, small streams (Bart and Taylor 1999, p. 32; Johnston and Kleiner 2001, pp. 3–4; Stiles and Blanchard 2001, pp. 1–4; Bart 2002, p. 1; Fluker *et al.* 2007, p. 1; Stiles and Mills 2008, pp. 1–4). Rush darters are also found in wetland pools and in some ephemeral tributaries of the aforementioned watersheds (Stiles and Mills 2008, pp. 2–3). This species also relies heavily on aquatic vegetation (Fluker *et al.* 2007, p. 1), including both small clumps and dense stands, and root masses of emergent vegetation along stream margins. These habitats tend to be shallow, clear, and cool, with moderate current and substrates composed of a combination of sand with silt, muck, gravel, or bedrock.



The species is found in both urban and industrial zoned areas (Jefferson County) and rural settings (Winston and Etowah Counties). Within these areas, the rush darters' habitat has been degraded by alteration of stream banks and bottoms; channelization; inadequate storm water management; inappropriate placement of culverts, pipes, and bridges; road maintenance; inadequate protection of groundwater recharge zones and aquifers; and haphazard silvicultural and agricultural practices. The persistence of a constant flow of clean groundwater from various springs has somewhat offset the destruction of the species' habitat, water quality, and water quantity; however, the species' status still appears to be declining.

#### Yellowcheek Darter

The yellowcheek darter (*Etheostoma moorei*) is endemic to the Devil's, Middle, South, and Archey forks of the Little Red River in Cleburne, Searcy, Stone, and Van Buren Counties in Arkansas (Robison and Buchanan 1988, p. 429). These streams are located primarily within the Boston Mountains subdivision of the Ozark Plateau. In 1962, the construction of a dam on the Little Red River to create Greers Ferry Reservoir impounded much of the range of this species, including the lower reaches of Devil's Fork, Middle Fork, South Fork, and portions of the main stem Little Red River, thus extirpating the species from these reaches. Cold tailwater releases below the dam preclude the yellowcheek darter from inhabiting the main stem Little Red River. The yellowcheek darter inhabits high-gradient headwater tributaries with clear water; permanent flow; moderate to strong riffles; and gravel, cobble, and boulder substrates (Robison and Buchanan 1988, p. 429). Prey items consumed by yellowcheek darters

include blackfly larvae, stoneflies, and mayflies.

Robison and Harp (1981, p. 5) estimated the range of the yellowcheek darter in the South Fork to extend from 2.9 km (1.8 mi) north northeast of Scotland, Arkansas, to U.S. Highway 65 in Clinton, Arkansas. The Middle Fork population was estimated to extend from just upstream of U.S. Highway 65 near Leslie, Arkansas, to 4.8 km (3.0 mi) west of Shirley, Arkansas. The Archey Fork population extended from its confluence with South Castleberry Creek to immediately downstream of U.S. Highway 65 in Clinton, Arkansas. The Devil's Fork population extended from 4.8 km (3.0 mi) north of Prim, Arkansas, to 6.1 km (3.8 mi) east southeast of Woodrow, Arkansas.

The yellowcheek darter is threatened primarily by factors associated with the present destruction, modification, or curtailment of its habitat or range. Threats include sedimentation and nutrient enrichment from impoundment, water diversion, gravel mining, channelization or channel instability, and natural gas development.

### Chucky Madtom

The Chucky madtom (*Noturus crypticus*) is a rare catfish found in Greene County, Tennessee. Specimens collected in Little Chucky Creek have been found in stream runs with slow to moderate current over pea gravel, cobble, or slab-rock boulder substrates (Burr *et al.* 2005, p. 797). These habitats are sparse in Little Chucky Creek, and the stream affords little loose, rocky cover suitable for madtoms (Shute *et al.* 1997, p. 8). It is notable that intact riparian buffers are present in the locations where Chucky madtoms have been found (Shute *et al.* 1997, p. 9).

Little is known about Chucky madtom life history and behavior; however, this information is available for other similar members of the *Noturus* group. Dinkins and Shute (1996, p. 50) found smoky madtoms (*N. baileyi*) underneath slab-rock boulders in swift to moderate current during May to early November. Habitat use shifted to shallow pools over the course of a 1-week period, coinciding with a drop in water temperature to 7 or 8 °C (45 to 46 °F), and persisted from early November to May. Eisenhour *et al.* (1996, p. 43) collected saddled madtoms (*N. fasciatus*) in gravel, cobble, and slab-rock boulders in riffle habitats with depths ranging from 0.1 to 0.3 m (0.3 to 1.0 ft). Based on their limited number of observations, Eisenhour *et al.* (1996, p. 43) hypothesized that saddled madtoms occupy riffles and runs in the daylight hours and then move to pools at night and during crepuscular hours (dawn and dusk) to feed.

The current range of the Chucky madtom is restricted to an approximate 3-km (1.8-mi) reach of Little Chucky Creek in Greene County, Tennessee. Degradation from sedimentation, physical habitat disturbance, and contaminants threaten the habitat and water quality on which the Chucky madtom depends. Sedimentation could negatively affect the Chucky madtom by reducing growth rates, disease tolerance, and gill function; reducing spawning habitat, reproductive success, and egg, larval, and juvenile development; reducing food availability through reductions in prey; and reducing foraging efficiency. Contaminants associated with agriculture (e.g., fertilizers, pesticides, herbicides, and animal waste) can cause degradation of water quality and habitats through instream oxygen deficiencies, excess nutrification, and excessive algal growths.

Laurel Dace

The laurel dace (*Chrosomus saylora*) is endemic to seven streams on the Walden Ridge portion of the Cumberland Plateau (Bledsoe, Rhea, and Sequatchie Counties, Tennessee), where drainages generally meander eastward before dropping abruptly down the plateau escarpment and draining into the Tennessee River. Laurel dace are known historically from seven streams in three disjunct systems: Soddy Creek; three streams that are part of the Sale Creek system (the Horn and Laurel branch tributaries to Rock Creek, and the Cupp Creek tributary to Roaring Creek); and three streams that are part of the Piney River system (Youngs, Moccasin, and Bumbee Creeks). In 1991, and in four other surveys (two in 1995, one in 1996, and one in 2004), laurel dace were not collected in Laurel Branch, leading Skelton to the conclusion that laurel dace had been extirpated from the stream (Skelton 1997, p. 13; Skelton 2001, p. 126; Skelton 2009, pers. comm.).

The current distribution of laurel dace encompasses six of seven historical streams; the species is considered extirpated from Laurel Branch (see above). In these six streams, the species is known to occupy reaches ranging in length from 0.3 to 8.0 rkm (0.2 to 5 rmi). Laurel dace have been most often collected from pools or slow runs from undercut banks or beneath slab-rock boulders, typically in first or second order, clear, cool (maximum temperature 26 °C or 78.8 °F) streams. Substrates in laurel dace streams typically consist of a mixture of cobble, rubble, and boulders, and the streams tend to have a dense riparian zone consisting largely of mountain laurel (Skelton 2001, pp. 125–126).

The primary threat to laurel dace throughout its range is excessive siltation resulting from agriculture and extensive silviculture, especially those involving inadequate riparian buffers in harvest areas and the failure to use best management

practices (BMPs) during road construction. Severe degradation from sedimentation, physical habitat disturbance, and contaminants threatens the habitat and water quality on which the laurel dace depends. Sedimentation negatively affects the laurel dace by reducing growth rates, disease tolerance, and gill function; reducing spawning habitat, reproductive success, and egg, larvae, and juvenile development; reducing food availability through reductions in prey; and reducing foraging efficiency.

### **Summary of Comments and Recommendations**

We requested written comments from the public on the proposed designation of critical habitat for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace during two comment periods. The first comment period associated with the publication of the proposed rule (76 FR 63360) opened on October 12, 2011, and closed on December 12, 2011. Based on a request made after the comment period had ended, we held a public informational meeting concerning the critical habitat designation for the yellowcheek darter on February 22, 2012, in Clinton, Arkansas, where we took comments on the proposed rule and notified the public that we would also take public comments on the rule through the end of the comment period for a draft economic analysis. That comment period opened May 24, 2012, and closed on June 25, 2012 (77 FR 30988). Based on a request received during the first comment period, we held a public hearing in Clinton, Arkansas, on June 7, 2012. We also contacted appropriate Federal, State, and local agencies; scientific organizations; and other interested parties and invited them to comment on the proposed rule and draft economic analysis during

these comment periods. We issued press releases and published legal notices in *The Times Tribune*, *Lexington Herald-Leader*, *Greenville Sun*, *Knoxville News Sentinel*, *The Herald News*, *Chattanooga Times Free Press*, *Birmingham News*, *Sand Mountain Reporter*, *NW Alabamian*, *Arkansas Democrat-Gazette*, *Van Buren County Democrat*, *The Sun Times*, *The Stone County Leader*, and the *Marshall Mountain Wave*. However, the *Marshall Mountain Wave* declined to publish a legal notice announcing the first public comment period.

During the first comment period, we received 66 comment letters directly addressing the proposed critical habitat designation. During the February 22, 2012, public informational meeting, 11 individuals or organizations made comments on the designation of critical habitat for the yellowcheek darter. During the second comment period, we received 54 comment letters addressing the proposed critical habitat designation or the draft economic analysis. During the June 7, 2012, public hearing, four individuals or organizations made comments on the designation of critical habitat for the yellowcheek darter. All substantive information provided during the comment periods has either been incorporated directly into this final determination or is addressed below. Comments received were grouped into five general issues categories, and are addressed in the following summary and incorporated into the final rule as appropriate.

#### *Peer Review*

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from 15 knowledgeable individuals with scientific expertise that included familiarity with the five species and the geographic region in which the species occur. We received responses from three of the peer reviewers.

We reviewed all comments received from the peer reviewers for substantive issues and new information regarding critical habitat for the five fishes. The peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions to improve the final critical habitat rule. Peer reviewer comments are addressed in the following summary and incorporated into the final rule as appropriate.

For the Cumberland darter, rush darter, and Chucky madtom, the peer reviewers agreed we relied on the best scientific information available, accurately described the species and its habitat requirements (primary constituent elements (PCEs)), accurately characterized the reasons for the species' decline and the threats to its habitat, and concurred with our critical habitat selection criteria. We did not receive any comments from peer reviewers related to the yellowcheek darter or laurel dace. We respond to all substantive comments below.

#### *Peer Reviewer Comments*

(1) *Comment:* The Northern Beltline Corridor will cross and impact the proposed rush darter critical habitat throughout its range in Jefferson County, Alabama, and stimulate growth and development throughout the area.

*Our Response:* The Northern Beltline Corridor has a Federal nexus through the Federal Highway Administration (FHA). The Service has provided official comment and evaluated the potential effects of the Beltline with respect to the vermilion darter (*Etheostoma chermockii*), watercress darter (*Etheostoma nuchale*), rush darter (*Etheostoma phytophylum*), and other trust resources in accordance with section 7 of the Act and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.). Species surveys were conducted during the period of August 29-30, 2011. No federally protected species were found during this survey. The rush darter is located in a few scattered tributaries that drain into the south side of Turkey Creek, which is a considerable distance from the proposed beltway impact areas. The corridor will not cross any rush darter habitat.

The Service determined that the project would have minimal to no effect on the rush darter, which occurs in a drainage removed from the action area (Everson 2012, pers. comm.).

(2) *Comment:* Predicted effects of climate change on the rush darter and its habitat should include protection of aquifers and recharge areas of groundwater input and corresponding higher water temperatures.



*Our Response:* The information currently available on the effects of global climate change and increasing temperatures does not make sufficiently precise estimates of the location and magnitude of the effects. We are also not currently aware of any climate change information specific to the habitat of the rush darter related to temperatures of groundwater outflows and stormwater inflows that are or would become important to the species in the future. Therefore, we are unable to determine what additional threats and corresponding appropriate actions to include in the final critical habitat for the rush darter or the other fishes in this rule to address the effects of this aspect of climate change.

(3) *Comment:* The critical habitat designated for the rush darter in the headwaters in Unit 2 should be expanded to adjacent areas and include the wetland on the western edge.

*Our Response:* Comment has been noted and after further analysis of the information within Service files and that provided by the commenter, the wetland on the western edge of Unit 2 has been included in the final critical habitat designation for the rush darter. This area contains the physical and biological features essential to the conservation of the species (PCEs 1-3) and which may require special management and protection. As a result of these changes, critical habitat designation has increased by an additional 85.8 m (0.05 mi.) and 0.13 ha (0.32 ac) in Unit 2 for the rush darter.

(4) *Comment:* One peer reviewer mentions that there are active strip mines in the area of the proposed rush darter critical habitat in Doe and Wildcat Branch, Winston County, Alabama. In the Energy Supply, Distribution, or Use determination, the Service only mentions that coal mining occurs or could occur in Cumberland darter units.

*Our Response:* Historically, there was an abundance of coal mining in Winston County, Alabama. Recently, coal mining has accelerated south of the watershed containing critical habitat for the rush darter. However, there are no active mines that impact the surface water of the proposed critical habitat for the rush darter. The Poplar Springs Mine is active, but is outside the proposed critical habitat unit, and no impacts to the surface waters are believed to occur (Drennen 2011, pers. obs.). Although there are no obvious coal mining impacts to surface water, little is known about groundwater impacts within the aquifer. These types of effects are untimely in expressing themselves and may not be known for many years, if indeed they do occur.

#### *Comments from States*

Section 4(i) of the Act states, “the Secretary shall submit to the State agency a written justification for his failure to adopt regulations consistent with the agency’s comments or petition.” We received one comment from the Kentucky Department of Fish and Wildlife Resources (KDFWR) related to road crossings and culverts acting as threats to the Cumberland darter. This comment was incorporated into this final rule. We did not receive any other substantive comments from the States (Alabama, Arkansas, Kentucky, or Tennessee) regarding the proposed rule. No official position was expressed by the States on the critical habitat designation.

(5) *Comment:* The KDFWR commented that culverts and impassable road crossings (fords) could act as barriers to dispersal for Cumberland darters, thereby contributing to population fragmentation and reduced gene flow among and between populations.

*Our Response:* We agree that impassable road crossings and culverts can limit or prevent natural dispersal of Cumberland darters, which can lead to population fragmentation and reduced gene flow. We discussed this potential threat (Factor E) in the final listing and proposed critical habitat rules, and we summarized our current knowledge of Cumberland darter dispersal behavior in the Physical and Biological Features section of this final critical habitat rule.

#### *Public Comments*

#### **Landowner Rights**

(6) *Comment:* The proposed designation will harm private landowners in Arkansas through increased government regulation, and will add unnecessary bureaucracy in the use of surface waters.

*Our Response:* The designation of critical habitat will not increase government regulation of private land in Arkansas. The effects of private activities are not subject to the Act's section 7 consultation requirements unless they are connected to a Federal

action. Federal activities conducted in or adjacent to areas designated as critical habitat are already subject to section 7 consultation requirements of the Act because of the presence of one or more species currently listed under the Act. Most normal operations for rearing of livestock, or for other land uses common to the upper Little Red River watershed in Arkansas, do not require Federal permits or actions. We do not anticipate that this designation will impose any additional direct regulatory burdens to private landowners in Arkansas.

*(7) Comment:* The designation of critical habitat for the yellowcheek darter will involve establishment of streamside buffers, exclusion of cattle from designated critical habitat through installation of new fencing, or taking of private land by the Federal government.

*Our Response:* The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Critical habitat designation does not regulate private actions on private lands or confiscate private property. It does not affect individuals, organizations, States, local governments or other non-Federal entities that do not require Federal permits or funding. Such designation does not allow the government or public to access private lands.

The designation of critical habitat does not create streamside buffers or impose requirements to fence livestock or other animals from streams. Waters of navigable streams, such as those designated as critical habitat for the yellowcheek darter, are considered public waters by the State of Arkansas. The designation includes river

channels within the ordinary high water line, which would not include adjacent private properties.

### **Procedural and Legal Considerations**

(8) *Comment:* Landowners have not been contacted and given the opportunity to respond to the proposed designation. Most landowners (in the Little Red River watershed, Arkansas) and the people of Arkansas did not know of the comment deadline; therefore, the comment period should be extended and public hearings conducted.

*Our Response:* When we issue a proposed rule, we want to ensure widespread knowledge and opportunity for the public to comment, particularly among those who may be potentially affected by the action. The proposed designation for yellowcheek darter covered portions of four Arkansas counties; therefore, it was impossible to personally contact all landowners in the area. However, we attempted to ensure that as many people as possible would be aware of the proposed designation through distribution of press releases to all major media in the affected area, including those in State capitols and major cities; publication of newspaper notices; and direct notification of affected State and Federal agencies, environmental groups, major industries, State Governors, Federal and State elected officials, and representatives associated with the National Championship Chuck Wagon Races (see *Previous Federal Actions*, above). We continued to accept all comments received after the initial public comment period ended to ensure that all interested parties would have the opportunity to comment on the proposed designation. Further, although the request for a public hearing was made after

the deadline for such requests, we held a public information meeting on February 22, 2012, and a public hearing on June 7, 2012, following the publication that made available the draft economic analysis (77 FR 30988). In short, we have complied with or exceeded all of the notification requirements of the Act.

### **Economic Impacts and Economic Analysis**

(9) *Comment:* Multiple commenters state that designation of critical habitat for the yellowcheek darter would negatively affect the National Championship Chuck Wagon Races by preventing horses from crossing the river or by preventing the event from occurring in the future. Additional comments state that the draft economic analysis (DEA) fails to consider the impacts of designation on the local economy of Van Buren County, Arkansas, where the event takes place. The commenters state that if the event is cancelled, impacts would include loss of business for local restaurants, motels, grocery stores, gas stations, and feed stores, and corresponding losses in local and State tax revenues.

*Our Response:* As stated in section 3.2.5 of the DEA, the Service anticipates that the landowner who hosts the 2012 National Championship Chuck Wagon Races could apply for a permit under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) to construct a dam for the races, and may develop a habitat conservation plan that would allow incidental taking of the species under section 10(a)(1)(B) of the Act. Both of these actions would lead to section 7 consultations with the Service. However, conservation measures that the Service would recommend to prevent adverse effects to the species

would also most likely prevent adverse modification of critical habitat and would occur regardless of critical habitat designation. It is, therefore, unlikely that critical habitat designation itself would affect the races by preventing horses from crossing the river or preventing the event from occurring. Therefore critical habitat designation is not expected to affect the regional economy.

(10) *Comment:* Multiple commenters state generally that the DEA does not adequately address the economic impacts of proposed critical habitat designation for the yellowcheek darter on cattle ranching, farming, silviculture, natural gas and oil exploration and development, and recreational activities. The commenters request that more studies be done on the economic impacts of the proposed designation. Multiple commenters suggest that the conservation measures that may result from the rule would put a significant burden on small ranching operations and other economic activities. Commenters specifically mention the following measures as being costly and potentially detrimental to their economic well-being: installation of fencing along the river to prevent access by livestock; prohibition of bank stabilization activities; and prohibition on using river water for irrigation purposes.

*Our Response:* As described in section 2.3.2 and Appendix D of the DEA, the incremental impacts of critical habitat designation are expected to be limited to any additional administrative costs of section 7 consultations. Voluntary conservation measures suggested by the Service would be recommended regardless of critical habitat designation, in order to avoid adverse effects to the species. Therefore, it is unlikely that

critical habitat designation itself would affect ranching, farming, silviculture, natural gas and oil exploration and development, or recreational activities through conservation recommendations such as installing fencing, bank stabilization, or prohibiting use of water for irrigation purposes.

(11) *Comment:* One commenter expresses concern that designation of critical habitat would hamper local fire department use of river water for rural fire fighting and pump testing.

*Our Response:* The local fire departments' use of river water would be unlikely to result in adverse modification of critical habitat due to the small amounts of water used for such activities and the fact that no Federal permit is required for these actions. Because there is no Federal permit required, there is no Federal nexus and no section 7 consultation required for these actions. Therefore, it is unlikely that critical habitat would generate recommendations that would hamper local fire departments' use of river water.

(12) *Comment:* Multiple commenters express concern that their land values will be negatively impacted by the designation of critical habitat and that the DEA does not take into account the impact of critical habitat designation on livelihoods and property values.

*Our Response:* The activities that may occur on a parcel of land are not expected to be limited by the designation of critical habitat because critical habitat is only



designated below the ordinary high water mark of streams and most activities occurring on lands adjacent to streams do not require Federal actions that would require section 7 consultation. Therefore, direct reductions in land value due to the designation are not expected. However, it is true that section 2.3.2 of the DEA describes the potential indirect regulatory uncertainty or stigma effect that the designation of critical habitat may have on property values. However, due to uncertainty surrounding the likelihood and extent of such indirect impacts, these potential effects are considered speculative. The uncertainty regarding the regulatory requirements associated with critical habitat may diminish as section 7 consultations are completed and additional information becomes available on the effects of critical habitat on specific activities.

(13) *Comment:* One commenter questioned how the DEA forecasts a value of \$140,000 for impacts relating to the designation of critical habitat for the yellowcheek darter.

*Our Response:* As noted in Exhibit ES-4 of the DEA, the present value of the total incremental costs of critical habitat designation for the yellowcheek darter is \$134,000 over the next 20 years, assuming a 7 percent discount rate. These costs reflect additional administrative effort as part of future section 7 consultations in order to consider the potential for activities to result in adverse modification of critical habitat. No change in economic activity levels or the management of economic activities is expected to result from the critical habitat designation.

(14) *Comment:* Multiple commenters express support for the designation of critical habitat for the laurel dace in Tennessee as they believe the designation would help prevent the development of new coal operations near Dayton, TN. Specifically, the comments state that proposed coal mining operations in the area, if initiated, would negatively affect the laurel dace and other species. One comment states that the area where the laurel dace is found is located very close to a “proposed coal processing plant location on Ogden Road, Dayton TN by Iron Properties.”

*Our Response:* The DEA discusses known coal mining activity in Tennessee in section 3.2.2. Data from the Office of Surface Mining Reclamation and Enforcement (OSMRE) indicate that there are two pending permits for coal mining activities in the Dayton area of Rhea County, TN. However, only one of these potential projects occurs within a watershed containing laurel dace critical habitat. As indicated in the DEA, this project is located in the watershed containing proposed critical habitat Unit 4 for the laurel dace. As indicated in Exhibit 3-4 of the DEA, it is expected that the Service will consult on this project with OSMRE under the Local Interagency Working Agreement described in section 3.2.2 of the DEA. However, because conservation measures suggested by the Service would be recommended regardless of critical habitat, in order to avoid adverse effects to the species, it is unlikely that critical habitat will generate any additional recommendations that will prevent the development of new coal operations near Dayton, TN.

(15) *Comment:* Multiple commenters elaborate on the potential benefits of the

proposed designation. At least one of these commenters suggests that the long-term economic benefits of designation are not adequately addressed in the proposed rule and DEA. Commenters suggest the indirect benefits of critical habitat designation include: water quality and supply improvements, opportunities to generate additional recreation-based economic activities (park visits, hiking, biking, fishing, camping, boating, and service industry), regional small business growth (recreational equipment industry, lodging industry, food industry, gas stations, and other services), increased property values, and increased tax revenues.

*Our Response:* As detailed in section 3.4 of the DEA, the analysis does not expect any changes in economic activity levels or the management of economic activities to result from critical habitat designation for the five fishes. Absent these changes, we do not expect the designation to result in any incremental economic benefits, such as water quality improvements, recreational opportunities, and increased property values. The DEA does, however, note that conservation for these species undertaken due to the listing (even absent the designation of critical habitat) may generate the types of benefits described in these comments.

### **Best Scientific Information**

(16) *Comment:* Critical habitat designation for the yellowcheek darter was not based on reliable scientific data and not enough habitat area was surveyed.

*Our Response:* The Act requires the Secretary of the Interior to use the best scientific and commercial data available when designating critical habitat for a species.

In fulfilling this requirement, we received and used information on the biology, ecology, distribution, abundance, status, and trends of species from a wide variety of sources. These sources include status surveys, biological assessments, and other unpublished material (that is, "gray literature") from State natural resource agencies and natural heritage programs, Tribal governments, other Federal agencies, consulting firms, contractors, and individuals associated with professional organizations and higher educational institutions. We also use published articles from professional journals. Service biologists are required to gather, review, and evaluate information from these sources prior to undertaking listing, recovery, consultation, and permitting actions. Additionally, Service biologists surveyed most of the areas proposed as critical habitat for the yellowcheek darter as part of a 2004 threats assessment for the endangered speckled pocketbook mussel (*Lampsilis streckeri*) and yellowcheek darter (Davidson and Wine 2004).

### **Factors Affecting the Species**

(17) *Comment:* One commenter stated that the Cumberland darter is threatened by degradation of water quality from large surface coal mines in the northern coalfields of Scott and Campbell Counties, Tennessee. In addition to this general concern, the commenter was aware of selenium contamination within these same watersheds and was aware of several notices of violation from the Tennessee Department of Environment and the OSMRE regarding degradation of water quality and impacts to aquatic species within these watersheds. The commenter feared that current mining activities and issuance of

new permits would cause further degradation to fish and wildlife habitats in Campbell and Scott Counties.

*Our Response:* We concur with the commenter that large surface coal mine operations in Campbell and Scott Counties, Tennessee, are a potential threat to the Cumberland darter, and have the potential to degrade water quality of Cumberland darter streams in these watersheds. Streams associated with surface coal mining and valley fills are typically characterized by elevated conductivity, elevated total dissolved solids, and increased concentrations of sulfate, bicarbonate ions, and metals such as manganese, iron, aluminum, and selenium. Increased levels of selenium have been shown to bioaccumulate in organisms, leading to deformities in larval fish and potentially harming birds that prey on fishes. The final listing rule (75 FR 36035) provided a more detailed analysis of these and other water quality threats to the Cumberland darter under **Summary of Factors of Factors Affecting the Species** (75 FR 36042).

(18) *Comment:* Two commenters raised the possibility that perched culverts or impassable road crossings (fords) represent a threat to the Cumberland darter and suggested that this potential threat may require special management considerations or protection. The commenters explained that perched culverts are common within the upper Cumberland River system, and they often restrict fish movements, as evidenced by lower species diversity observed by the commenters upstream of these culverts. The commenters also suggested that connectivity of Cumberland darter streams could be

affected by these barriers, leading to further isolation of these populations and preventing the free exchange of genetic material between populations.

*Our Response:* We agree with the commenters that perched culverts represent a potential threat to the Cumberland darter. We, too, have observed perched culverts in the upper Cumberland River system, and we often observe lower species diversity in reaches upstream of these culverts. To address the potential threat posed by these barriers, we have included additional text in the *Special Management Considerations or Protection* section (below) that identifies the threat and lists potential management activities that could ameliorate the threat.

(19) *Comment:* One commenter raised the possibility that agricultural practices pose a threat to the Chucky madtom by eliminating riparian buffers, warming stream temperatures, and introducing fertilizer into the water.

*Our Response:* We agree with the commenter that agriculture can pose a threat to the Chucky madtom. We have included additional text in the *Special Management Considerations or Protection* section (below) that identifies the threat and lists potential management activities that could ameliorate the threat.

(20) *Comment:* Two commenters raised the concern that coal exploration in the Rock Creek Lands Unsuitable for Mining area indicates a potential threat to the laurel dace from future coal mining in the southern coalfield areas of Tennessee.

*Our Response:* We agree with the commenters that possible future coal mining in southern Tennessee represents a potential threat to the laurel dace. To address the potential threat posed by coal mining and acid mine drainage, we have included additional text in the *Special Management Considerations or Protection* section that identifies the threat and lists potential management activities that could ameliorate the threat.

### **Summary of Changes from Proposed Rule**

In preparing this final critical habitat designation for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace, we reviewed and considered comments from the public on the proposed designation of critical habitat published on October 12, 2011 (76 FR 63360) and our announcement of the availability of the DEA published on May 24, 2012 (77 FR 30988). We likewise reviewed and considered comments from a public informational meeting held on February 22, 2012, and a public hearing held on June 7, 2012, both in Clinton, Arkansas. As a result of public comments and peer review, we made changes to our designation of critical habitat for these five fishes. These changes are as follows:

(1) We added additional threats information for the Cumberland darter, rush darter, Chucky madtom, and laurel dace.

(2) We capitalized the common name of the Chucky madtom, to reflect the fact that it is named after Little Chucky Creek, and is therefore, a proper noun. We updated a

reference for Chucky madtom habitat and threats, and clarified that Little Chucky Creek is the entire current range (but not the entire historic range) of the Chucky madtom in the *Criteria Used to Identify Critical Habitat* section.

(3) We updated the total number of river kilometers for the Cumberland darter unit 1, and all four yellowcheek darter units, due to a change in mapping methodology. The beginning and ending points of critical habitat, as well as the unit descriptions (as described in the proposed critical habitat rule) remain the same. The change in mapping results from standardizing methods used to estimate the unit lengths designated as critical habitat for all five species. This methodology better follows the meander of the river channel and results in an additional 0.5 river kilometers (rkm) (0.3 river miles (rmi)) for the Cumberland darter, and an additional 6.6 rkm (4.1 rmi) for the yellowcheek darter.

(4) We revised the ownership of one property for the yellowcheek darter critical habitat, resulting in a change of the total number of river kilometers in private ownership from 148 rkm (92 rmi) to 162.7 rkm (101.1 rmi), as well as a corresponding downward revision in the other ownership types.

(5) We revised the *Energy Supply, Distribution, or Use—Executive Order 13211* section to state that coal mining could potentially occur in one of six critical habitat units for the laurel dace.

(6) We added a spring run and associated wetlands to Unit 2 as critical habitat for the rush darter. This 0.13 ha (0.32 ac) spring associated wetland and 85.8 m (0.05 mi)



spring run is adjacent to the headwaters of the Unnamed Tributary to Beaver Creek and is privately owned.

(7) We corrected errors in calculating total length and area in Table 2 for the rush darter.

## **Critical Habitat**

### *Background*

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided under the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and

transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner seeks or requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species

(such as space, food, cover, and protected habitat). In identifying those physical and biological features within an area, we focus on the principal biological or physical constituent elements (primary constituent elements such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, soil type) that are essential to the conservation of the species. Primary constituent elements are the elements of physical or biological features that, when laid out in the appropriate quantity and spatial arrangement to provide for a species' life-history processes, are essential to the conservation of the species.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. For example, an area currently occupied by the species but that was not occupied at the time of listing may be essential to the conservation of the species and may be included in the critical habitat designation. We designate critical habitat in areas outside the geographical area occupied by a species only when a designation limited to its range would be inadequate to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act

and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act, (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to insure their actions are not likely to jeopardize the continued existence of any endangered or threatened species, and (3) the prohibitions of section 9 of the Act if actions occurring in these areas may affect the species. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the

best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

### *Physical and Biological Features*

In accordance with sections 3(5)(A)(i) and 4(b)(1)(A) of the Act and regulations at 50 CFR 424.12, in determining which areas within the geographical area occupied by the species at the time of listing to designate as critical habitat, we consider the physical or biological features essential to the conservation of the species and which may require special management considerations or protection. These include, but are not limited to:

- (1) Space for individual and population growth and for normal behavior;
- (2) Food, water, air, light, minerals, or other nutritional or physiological requirements;
- (3) Cover or shelter;
- (4) Sites for breeding, reproduction, or rearing (or development) of offspring; and
- (5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distribution of a species.

We derive the specific physical or biological features essential for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace from studies of these species' habitats, ecology, and life history as described in the

**Critical Habitat** section of the proposed rule to designate critical habitat published in the **Federal Register** on October 12, 2011 (76 FR 63360), and in the information presented below. Additional information can be found in the final listing rule published in the **Federal Register** on August 9, 2011 (76 FR 48722). We have determined that these five species require the physical or biological features described below.

*Space for Individual and Population Growth and for Normal Behavior*

Cumberland Darter

Little is known about the specific space requirements of the Cumberland darter; however, the species is typically found in low to moderate gradient, second- to fourth-order, geomorphically stable streams, where it occupies shallow pools or runs with gentle current over sand or sand-covered bedrock substrates with patches of gravel or debris (O'Bara 1991, p. 10; Thomas 2007, p. 4). Geomorphically stable streams transport sediment while maintaining their horizontal and vertical dimensions (width to depth ratio and cross-sectional area), pattern (sinuosity), and longitudinal profile (riffles, runs, and pools), thereby conserving the physical characteristics of the stream, including bottom features such as riffles, runs, and pools and the transition zones between these features. The protection and maintenance of these habitat features accommodate spawning, rearing, growth, migration, and other normal behaviors of the Cumberland darter.

Limited information exists with regard to upstream or downstream movements of Cumberland darters; however, Winn (1958a, pp. 163–164) reported considerable pre-spawn movements for its closest relative, the Johnny darter. In Beer Creek, Monroe County, Michigan, Johnny darters migrated several miles between temporary stream

habitats and permanent pools in downstream reaches. Recent capture data for tagged individuals in Cogur Fork, McCreary County, Kentucky, demonstrate that Cumberland darters may make similar movements (Thomas 2010, pers. comm.). Individuals tagged and released by the Kentucky Department of Fish and Wildlife Resources (KDFWR) and Conservation Fisheries, Inc. (CFI), traveled distances ranging from 0.4 to 0.7 rkm (0.2 to 0.4 rmi) between their release date of September 22, 2010, and their recapture date of November 9, 2010 (period of 48 days) (Thomas 2010, pers. comm.). Over longer periods, it is likely that Cumberland darters can utilize stream reaches longer than 0.7 rkm (0.4 rmi).

The current range of the Cumberland darter has been reduced to 13 streams (15 occurrences) due to destruction and fragmentation of habitat. Fragmentation of the species' habitat has subjected these small populations to genetic isolation, reduced space for rearing and reproduction, reduced adaptive capabilities, and an increased likelihood of local extinctions (Burkhead *et al.* 1997, pp. 397–399; Hallerman 2003, pp. 363–364). Genetic variation and diversity within a species are essential for recovery, adaptation to environmental change, and long-term viability (capability to live, reproduce, and develop) (Noss and Cooperrider 1994, pp. 282–297; Harris 1984, pp. 93–107; Fluker *et al.* 2007, p. 2). The long-term viability of a species is founded on the conservation of numerous local populations throughout its geographic range (Harris 1984, pp. 93–104). Connectivity of these habitats is essential in preventing further fragmentation and isolation of Cumberland darter populations and promoting species movement and genetic flow between populations.

Therefore, based on the information above, we identify shallow pools and runs

and associated stream segments of geomorphically stable, second- to fourth-order streams to be an essential physical or biological feature for the Cumberland darter. The connectivity of these habitats is essential in accommodating feeding, breeding, growth, and other normal behaviors of the Cumberland darter and in promoting gene flow within the species.

### Rush Darter

Little is known about the specific space requirements of the rush darter in the Turkey Creek, Little Cove-Bristow Creek, and Clear Creek systems (Boschung and Mayden 2004, p. 551); however, in general, darters depend on space within geomorphically stable streams with varying water quantities and flow. Specifically, rush darters appear to prefer springs and spring-fed reaches of relatively low-gradient, small streams (Bart and Taylor 1999, p. 32; Johnston and Kleiner 2001, pp. 3–4; Stiles and Blanchard 2001, pp. 1–4; Bart 2002, p. 1; Fluker *et al.* 2007, p. 1; Stiles and Mills 2008, pp. 1–4) and wetland pools (Stiles and Mills 2008, pp. 2–3). This species also relies heavily on aquatic vegetation (Fluker *et al.* 2007, p. 1) including: Root masses of emergent vegetation along the margins of spring-fed streams in very shallow, clear, cool, and flowing water; and both small clumps and dense stands of watercress (*Nasturtium officinale*), parrots feather (*Myriophyllum* sp.), rushes (*Juncus* spp.), sedges (*Carex* spp.), bur reed (*Sparganium* sp.), and coontail (*Ceratophyllum* sp.). The rush darter inhabits streams with substrates of silt, sand, sand and silt, muck and sand or some gravel with sand, and bedrock.



Geomorphically stable streams transport sediment while maintaining their horizontal and vertical dimensions (width to depth ratio and cross-sectional area), pattern (sinuosity), and longitudinal profile (riffles, runs, and pools), thereby conserving the physical characteristics of the stream, including bottom features such as riffles, runs, and pools and the transition zones between these features that contain some silt, sand, and finer substrates. The riffles, runs, and pools not only provide space for the rush darter, but also provide space for emergent vegetation in shallow water along the margins of the small streams and springs for cover, and shelter necessary for breeding, reproduction, and growth of offspring.

The current range of the rush darter within the entire Turkey Creek, Clear Creek, and Little Cove-Bristow Creek watersheds is reduced to localized sites due to fragmentation, separation, and destruction of rush darter habitats and populations. There are dispersal barriers (pipes and culverts for road crossings; channelized stream segments; and emergent aquatic plant control, which eliminates cover habitat for the species) and an increased amount of water extraction, which results in insufficient aquifer recharge zones that may contribute to the separation and isolation of rush darter populations and affect water quality. Fragmentation of the species' habitat has isolated populations and reduced available spaces for rearing and reproduction, thereby reducing adaptive capability and increasing the likelihood of local extinctions (Burkhead *et al.* 1997, pp. 397–399; Hallerman 2003, pp. 363–364). Genetic variation and diversity within a species are essential for recovery, adaptation to environmental changes, and long-term viability (capability to live, reproduce, and develop) (Harris 1984, pp. 93–107; Noss and Cooperrider 1994, pp. 282–297; Fluker *et al.* 2007, p. 2). Long-term viability

is founded on numerous interbreeding, local populations throughout the range (Harris 1984, pp. 93–107). Continuity of water flow between suitable habitats is essential in preventing further fragmentation of the species' habitat and populations, conserving the essential emergent vegetation in shallow water on the margins of small streams and springs, and promoting genetic flow throughout the populations. Continuity of habitat will maintain spawning, foraging, and resting sites, and allow for gene flow throughout the population. Connectivity of habitats, as a whole, also permits improvement in water quality and water quantity by allowing unobstructed water flow throughout the connected habitats.

Therefore, based on the information above, we identify springs and spring-fed reaches of relatively low-gradient, geomorphically stable streams with emergent vegetation to be an essential physical or biological feature for the rush darter. The connectivity of these habitats is essential in accommodating feeding, breeding, growth, and other normal behaviors of the rush darter and in promoting gene flow within the species.

#### Yellowcheek Darter

The yellowcheek darter is typically found in clear, high-gradient, second- to fifth-order, geomorphically stable streams that maintain permanent year-round flows (Robison and Buchanan 1988, p. 429). The species occupies riffles with moderate to fast current over gravel, cobble, and boulder substrates (Robison and Buchanan 1988, p. 429). Geomorphically stable streams transport sediment while maintaining their horizontal and vertical dimensions (width to depth ratio and cross-sectional area), pattern (sinuosity),

and longitudinal profile (riffles, runs, and pools), thereby conserving the physical characteristics of the stream, including bottom features such as riffles, runs, and pools and the transition zones between these features. The protection and maintenance of these habitat features accommodate spawning, rearing, growth, migration, and other normal behaviors of the yellowcheek darter.

In 1962, the construction of Little Red River Dam to create Greers Ferry Reservoir impounded much of the range of the yellowcheek darter, including the lower reaches of Devil's Fork, Middle Fork, South Fork, and portions of the main stem Little Red River, thus extirpating the species from these reaches. The yellowcheek darter was also extirpated from the Little Red River downstream of Greers Ferry Reservoir due to cold tailwater releases. The lake flooded optimal habitat for the species, and caused genetic isolation of populations (McDaniel 1984, p. 1), with only the South and Archey forks of the Little Red River maintaining a non-inundated confluence.

As stated earlier, of the four streams supporting the yellowcheek darter, only the South and Archey forks maintain a non-inundated confluence. Instream habitat at the confluence of the two streams is suboptimal due to previous channelization, but restoration could provide an opportunity for vital population interactions between streams to maintain genetic diversity. Fragmentation of the species' habitat has subjected these small populations to genetic isolation, reduced space for rearing and reproduction, reduced adaptive capabilities, and an increased likelihood of local extinctions (Burkhead *et al.* 1997, pp. 397–399; Hallerman 2003, pp. 363–364). Genetic variation and diversity within a species are essential for recovery, adaptation to environmental change, and long-term viability (capability to live, reproduce, and develop) (Harris 1984, pp. 93–107; Noss

and Cooperrider 1994, pp. 282–297; Fluker *et al.* 2007, p. 2). The long-term viability of a species is founded on the conservation of numerous local populations throughout its geographic range (Harris 1984, pp. 93–104). Connectivity of these habitats is essential to prevent further fragmentation and isolation of yellowcheek darter populations and to promote species movement and genetic flow between populations.

Therefore, based on the information above, we identify riffles of geomorphically stable, second- to fifth-order streams to be an essential physical or biological feature for the yellowcheek darter. The connectivity of these habitats is essential to accommodate feeding, breeding, growth, and other normal behaviors of the yellowcheek darter and to promote gene flow within the species.

#### Chucky Madtom

Little is known about the specific space requirements of the Chucky madtom; however, all of the specimens collected in Little Chucky Creek have been found in shallow pool and run habitats with slow to moderate current over pea gravel, cobble, or slab-rock boulder substrates (Burr *et al.* 2005, p. 797). Geomorphically stable streams transport sediment while maintaining their horizontal and vertical dimensions (width to depth ratio and cross-sectional area), pattern (sinuosity), and longitudinal profile (riffles, runs, and pools), thereby conserving the physical characteristics of the stream, including bottom features, such as riffles, runs, and pools and the transition zones between these features. The protection and maintenance of these habitat features accommodate spawning, rearing, growth, migration, and other normal behaviors of the Chucky madtom.

The current range of the Chucky madtom has been reduced to only one stream due to fragmentation and destruction of habitat. Habitat fragmentation has subjected the small population to genetic isolation, reduced space for rearing and reproduction, reduced adaptive capabilities, and increased the likelihood of extinction (Burkhead *et al.* 1997, pp. 397–399; Hallerman 2003, pp. 363–364). Genetic variation and diversity within a species are essential for recovery, adaptation to environmental change, and long-term viability (capability to live, reproduce, and develop) (Harris 1984, pp. 93–107; Noss and Cooperrider 1994, pp. 282–297; Fluker *et al.* 2007, p. 2). The long-term viability of a species is founded on the conservation of numerous local populations throughout its geographic range (Harris 1984, pp. 93–104). Connecting instream habitats is essential in preserving the genetic viability of the Chucky madtom in Little Chucky Creek.

Therefore, based on the information above, we identify shallow pools and runs of geomorphically stable streams to be an essential physical or biological feature for the Chucky madtom. The connectivity of these habitats is essential to accommodate feeding, breeding, growth, and other normal behaviors of the Chucky madtom and to promote gene flow within the species.

#### Laurel Dace

Little is known about the specific space requirements of the laurel dace; however, the species is typically found in low to moderate gradient, first- to second-order, geomorphically stable streams. The laurel dace occupies pools or slow runs beneath undercut banks or slab-rock boulders in clear, cool (maximum temperature 26 °C (78.8 °F)) streams. Substrates in streams where laurel dace are found typically consist of a

mixture of cobble, rubble, and boulders, and the streams tend to have a dense riparian zone consisting largely of mountain laurel (Skelton 2001, pp. 125–126).

Geomorphically stable streams transport sediment while maintaining their horizontal and vertical dimensions (width to depth ratio and cross-sectional area), pattern (sinuosity), and longitudinal profile (riffles, runs, and pools), thereby conserving the physical characteristics of the stream, including bottom features such as riffles, runs, and pools and the transition zones between these features. The protection and maintenance of these habitat features accommodate spawning, rearing, growth, migration, and other normal behaviors of the laurel dace.

Strange and Skelton (2005, p. 8) assessed the genetic structure within populations of laurel dace, and, based on distribution of genetic diversity among populations, they recognized two genetically distinct management units: (1) The southern populations in Sale and Soddy creeks, and (2) the northern population in the Piney River system.

The current range of the laurel dace has been reduced to short reaches (approximately 0.3 to 8 rkm (0.2 to 5 rmi) in length) of six streams due to fragmentation and destruction of habitat. Fragmentation of the species' habitat has subjected these small populations to genetic isolation, reduced space for rearing and reproduction, reduced adaptive capabilities, and an increased likelihood of local extinctions (Burkhead *et al.* 1997, pp. 397–399; Hallerman 2003, pp. 363–364). Genetic variation and diversity within a species are essential for recovery, adaptation to environmental change, and long-term viability (capability to live, reproduce, and develop) (Harris 1984, pp. 93–107; Noss and Cooperrider 1994, pp. 282–297; Fluker *et al.* 2007, p. 2). The long-term viability of a species is founded on the conservation of numerous local populations throughout its

geographic range (Harris 1984, pp. 93–104). Connectivity of these habitats is essential in preventing further fragmentation and isolation of laurel dace populations.

Therefore, based on the information above, we identify shallow pools and runs and associated stream segments of geomorphically stable, first- to second-order streams with riparian vegetation to be an essential physical or biological feature for the laurel dace. The connectivity of these habitats is essential in accommodating feeding, breeding, growth, and other normal behaviors of the laurel dace and in promoting gene flow within the species.

#### *Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements*

##### Cumberland Darter

Feeding habits of the Cumberland darter are unknown but are likely similar to that of its sister species, the Johnny darter (*Etheostoma nigrum* Rafinesque). Johnny darters are diurnal sight feeders, with prey items consisting of midge larvae, mayfly nymphs, caddisfly larvae, and microcrustaceans (Kuehne and Barbour 1983, p. 104; Etnier and Starnes 1993, p. 511). Similar to other darters, juvenile Cumberland darters likely feed on planktonic organisms or other small invertebrates.

Like most other darters, the Cumberland darter depends on perennial stream flows that create suitable habitat conditions needed for successful completion of its life cycle. An ample supply of flowing water provides a means of transporting nutrients and food items, moderating water temperatures and dissolved oxygen levels, removing fine sediments that could damage spawning or foraging habitats, and diluting nonpoint source pollutants. Water withdrawals do not represent a significant threat to the species, but the

species is faced with occasional low-flow conditions that occur during periods of drought. One such event occurred in the summer and fall of 2007, when recorded streamflows in the upper Cumberland River basin of Kentucky and Tennessee (USGS Station Number 03404000) were among the lowest monthly values of the last 67 years (Cinotto 2008, pers. comm.).

Water quality is also important to the persistence of the Cumberland darter. The species requires relatively clean, cool, flowing water to successfully complete its life cycle, but specific water quality requirements (such as temperature, dissolved oxygen, pH, and conductivity) that define suitable habitat conditions for the Cumberland darter have not been determined. In general, optimal water quality conditions for fishes and other aquatic organisms are characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, and the lack of harmful levels of pollutants, such as inorganic contaminants like iron, manganese, selenium, and cadmium; organic contaminants such as human and animal waste products; pesticides and herbicides; nitrogen, potassium, and phosphorus fertilizers; and petroleum distillates.

Sediment is the most common pollutant within the upper Cumberland River system (KDOW 1996, pp. 50–53, 71–75; 2002, pp. 39–40; 2006, pp. 178–185), and the primary sources of sediment include resource extraction (e.g., coal mining, silviculture, natural gas development), agriculture, road construction, and urban development (Waters 1995, pp. 2–3; Skelton 1997, pp. 17, 19; KDOW 2006, pp. 178–185; Thomas 2007, p. 5). Siltation (excess sediments suspended or deposited in a stream) has been shown to abrade and suffocate bottom-dwelling organisms; reduce aquatic insect diversity and abundance; impair fish feeding behavior by altering prey base and reducing visibility of prey; impair



reproduction due to burial of nests; and, ultimately, negatively impact fish growth, survival, and reproduction (Waters 1995, pp. 5–7, 55–62; Knight and Welch 2001, pp. 134–136). O’Bara (1991, p. 11) reported that Cumberland darter habitats are very susceptible to siltation because of the habitat’s low to moderate gradient, low velocity, and shallow depth. O’Bara (1991, p. 11) concluded that siltation was the major limiting factor for the species’ continued existence and its ability to colonize new stream systems.

Cumberland darters are threatened by water quality degradation caused by a variety of nonpoint source pollutants. Coal mining represents a major source of nonpoint source pollutants (O’Bara 1991, p. 11; Thomas 2007, p. 5), because it has the potential to contribute high concentrations of dissolved metals and other solids that lower stream pH or lead to elevated levels of stream conductivity (Pond 2004, pp. 6–7, 38–41; Mattingly *et al.* 2005, p. 59). These impacts have been shown to negatively affect fish species, including listed species, in the Clear Fork system of the Cumberland basin (Weaver 1997, pp. 29; Hartowicz 2008, pers. comm.). The direct effect of elevated stream conductivity on fishes, including the Cumberland darter, is poorly understood, but some species, such as blackside dace (*Chrosomus cumberlandensis*), have shown declines in abundance over time as conductivity increased in streams affected by mining (Hartowicz 2008, pers. comm.). Other nonpoint source pollutants that affect the Cumberland darter include domestic sewage (through septic tank leakage or straight pipe discharges); agricultural pollutants such as fertilizers, pesticides, herbicides, and animal waste; and other chemicals associated with oil and gas development. Nonpoint source pollutants can cause excess nutrification (increased levels of nitrogen and phosphorus), excessive algal growth, instream oxygen deficiencies, increased acidity and conductivity, and other

changes in water chemistry that can negatively impact aquatic species (KDOW 1996, pp. 48–50; 2006, pp. 70–73).

Therefore, based on the information above, we identify aquatic macroinvertebrate prey items; permanent surface flows, as measured during average rainfall years; and adequate water quality with substrates that are relatively silt-free to be an essential physical or biological feature for the Cumberland darter. Relatively silt-free is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact to the species.

#### Rush Darter

Feeding habits of the rush darter are unknown but are likely similar to that of its sister species, the goldstripe darter (*Etheostoma parvipinne*). The goldstripe darter is a benthic (bottom) insectivore and is known to consume midge larvae, mayfly nymphs, blackfly larvae, beetles, and microcrustaceans (Mettee *et al.* 1996, p. 655). Extremes in variations in instream flows maintain the stream bottom substrates, providing oxygen and other attributes to various invertebrate life stages. Sedimentation has been shown to wear away and suffocate periphyton (organisms that live attached to objects underwater), disrupt aquatic insect communities (Waters 1995, pp. 53–86; Knight and Welch 2001, pp. 132–135), and reduce photosynthesis in aquatic vegetation. In addition, nutrification promotes heavy algal growth that covers and eliminates the clean rock, gravel, and vegetative habitats necessary for rush darter feeding. Thus, a decrease in water quality and instream flow would correspondingly cause a decline in the major food species for the rush darter. On the other hand, excessive instream flow can also damage and uproot

aquatic vegetation necessary for foraging and feeding habitat.

Much of the cool, clean water provided to the Turkey Creek system (Beaver Creek, Unnamed Tributary to Beaver Creek, Tapawingo or Penny Springs and the Highway 79 site; Jefferson County) and Cove Spring run of Little Cove Creek (Etowah County) comes from consistent and steady groundwater sources (springs and seeps). Clear, flowing water provides a means for transporting nutrients and food items, moderating water temperatures and dissolved oxygen levels, and diluting nonpoint and point source pollution. Without clean water sources, water quality and water quantity would be considerably lower and would significantly impair the normal life stages and behavior of the rush darter.

Favorable water quantity for the rush darter includes moderate water velocity in riffles and no flow or low flow in pools (Stiles and Mills 2008, pp. 1–4), a continuous daily discharge that allows for longitudinal connectivity within the species' habitat (Instream Flow Council 2004, p. 117), and discharge from both surface water runoff and groundwater sources (springs and seepages). Along with the continuous daily discharge, both minimum and flushing flows are necessary to remove fine sediments and dilute other pollutants (Moffett and Moser 1978, pp. 20–21; Gilbert *et al.*, eds. 1994, pp. 505–522; Instream Flow Council 2004, pp. 103–104; Drennen 2009, pers. obs.). At some sites, water depth ranges from 3.0 to 50 cm (0.1 to 1.6 ft). Groundwater provides a constant source of flows to dilute pollutants and maintain water quality for the persistence of the rush darter.

Factors that can potentially alter water quality include: Droughts and periods of low seasonal flow, precipitation events, nonpoint source runoff, human activities within

the watershed, random spills, unregulated stormwater discharge events (Instream Flow Council 2004, pp. 29–50), and water extraction. Instream pooling may also affect water quality by reducing water flow, altering temperatures, concentrating pollutants (Blanco and Mayden 1999, pp. 5–6, 36), and retarding aquatic and emergent vegetation growth.

Fishes require acceptable levels of dissolved oxygen. Generally, among fishes, the young life forms require more dissolved oxygen and are the most sensitive. The amount of dissolved oxygen that is present in the water (the saturation level) depends upon water temperature. As water temperature increases, the saturated dissolved oxygen level decreases. The more oxygen there is in the water, the greater the assimilative capacity (ability to consume organic wastes with minimal impact) of that water; lower water flows have a reduced assimilative capacity (Pitt 2000, pp. 6–7). Low-flow conditions affect the chemical environment occupied by fishes; extended low-flow conditions coupled with higher pollutant levels could likely result in behavioral changes within all life stages, which could be particularly detrimental to early life stages (e.g., embryo, larvae, and juvenile).

Optimal water quality lacks harmful levels of pollutants, such as inorganic contaminants like copper, arsenic, mercury, and cadmium; organic contaminants such as human and animal waste products; endocrine-disrupting chemicals; pesticides; nitrogen, potassium, and phosphorous fertilizers; and petroleum distillates (Alabama Department of Environmental Management (ADEM) 1996, pp. 13–15). Sediment is the most abundant pollutant produced in the Mobile River Basin (ADEM 1996, pp. 13–15). Siltation (excess sediments suspended or deposited in a stream) contributes to turbidity of the water and has been shown to reduce photosynthesis in aquatic plants, suffocate

aquatic insects, smother fish eggs, clog fish gills, and may fill in essential interstitial spaces (spaces between stream substrates) used by aquatic organisms for spawning and foraging; therefore, excessive siltation negatively impacts fish growth, physiology, behavior, reproduction, and survival. Nutrification (excessive nutrients present, such as nitrogen and phosphorous) promotes heavy algal growth that covers and eliminates clean rock or gravel habitats and aquatic and emergent vegetation, which are necessary for rush darter feeding and spawning. Generally, early life stages of fishes are less tolerant of environmental contamination than adults or juveniles (Little *et al.* 1993, p. 67). Appropriate water quality and quantity are necessary to dilute impacts from stormwater and other unnatural effluents. Harmful levels of pollutants impair critical behavior processes in fishes, as reflected in population-level responses (reduced population size, biomass, year class success, etc.). However, excessive water quantity in the form of substantial stormwater runoff may destabilize and move bottom and bankside substrates and increase instream sedimentation.

Essential water quality attributes for darters and other fish species in fast to medium water flow streams include the following: Dissolved oxygen levels greater than 6 parts per million (ppm), temperatures between 7 and 26.7 °C (45 and 80 °F) with spring egg incubation temperatures from 12.2 to 18.3 °C (54 to 65 °F), a specific conductance (ability of water to conduct an electric current, based on dissolved solids in the water) of less than approximately 225 micro Siemens per cm at 26.7 °C (80 °F), and low concentrations of free or suspended solids (organic and inorganic sediments) less than 10 Nephelometric Turbidity Units (NTU; units used to measure sediment discharge) and 15 milligrams/Liter (mg/L) total suspended solids (TSS; measured as mg/L of sediment in

water) (Teels *et al.* 1975, pp. 8–9; Ultschet *et al.* 1978, pp. 99–101; Ingersoll *et al.* 1984, pp. 131–138; Kundell and Rasmussen 1995, pp. 211–212; Henley *et al.* 2000, pp. 125–139; Meyer and Sutherland 2005, pp. 43–64).

Therefore, based on the information above, we identify cool, clean, flowing water; shallow depths; moderate water velocity in riffles and low flow in pools; aquatic macroinvertebrate prey items; aquatic vegetation; and adequate water quality to be an essential physical or biological feature for the rush darter.

### Yellowcheek Darter

Adult and juvenile yellowcheek darters' prey items include blackfly larvae, stonefly larvae, mayfly nymphs, and caddisfly larvae among other stream insects (McDaniel 1984, p. 56). McDaniel (1984, p. 37) noted a strong selectivity by yellowcheek darters for fly larvae year round, while other prey taxa were consumed proportionally depending on seasonal availability. Larval stages of yellowcheek darters have not been studied in the field but are assumed to feed on planktonic organisms based on laboratory rearing efforts and known larval fish dietary habits.

Drought conditions and low water levels have been identified as contributing factors in the decline of the yellowcheek darter (Wine *et al.* 2000, p. 11). Expanding natural gas development activities that began in the upper Little Red River watershed in 2005 require large quantities of water and pose a threat to the continued existence of the yellowcheek darter (75 FR 36045, June 24, 2010). Water diversion from the Middle and South forks has increased in recent years due to large-scale extraction of natural gas in the Fayetteville Shale (which encompasses nearly all of the upper Little Red River

drainage). Natural gas development is imminent in the Archey and Devil's forks as well and is predicted to affect numerous tributaries in all four watersheds. Because the yellowcheek darter requires permanent flows with moderate to strong current (Robison and Buchanan 1988, p. 429), seasonal fluctuations in stream flows exacerbated by water diversion for natural gas, agricultural, municipal, or other land uses represent a serious threat to the species.

In addition to water quantity, water quality is also important to the persistence of the yellowcheek darter. Although the Middle Fork is designated as an Extraordinary Resource Water, it is listed as impaired along a 33.5-km (20.8-mi) reach due to fecal coliform bacteria contamination according to the Arkansas Department of Environmental Quality (ADEQ) List of Impaired Waterbodies. This same report listed a 3.2-km (2.0-mi) stretch of the South Fork as impaired due to elevated mercury levels (ADEQ 2010, p. 22). Boston Mountain streams that support the yellowcheek darter are typically characterized by adequate water quality; however, increasing activity within the watersheds related to resource extraction, urban development, and other human-related activities is reason for concern regarding the recovery potential of the yellowcheek darter.

Therefore, based on the information above, we identify aquatic macroinvertebrate prey items; permanent surface flows, as measured during average rainfall years; moderate to strong water velocity in riffles; and adequate water quality to be an essential physical or biological feature for the yellowcheek darter.

Chucky Madtom

The Chucky madtom's prey items are unknown; however, least madtom (*Noturus hildebrandi*) prey items include midge larvae, caddisfly larvae, stonefly larvae, and mayfly nymphs (Mayden and Walsh 1984, p. 339). In smoky madtoms, mayfly nymphs comprised 70.7 percent of stomach contents analyzed, followed by fly, mosquito, midge, and gnat larvae (2.4 percent); caddisfly larvae (4.4 percent); and stonefly larvae (1.0 percent) (Dinkins and Shute 1996, p. 61). Significant daytime feeding was observed in smoky madtoms.

The TVA Index of Biological Integrity results indicate that Little Chucky Creek is biologically impaired (Middle Nolichucky Watershed Alliance 2006, p. 13). Given the predominantly agricultural land use within the Little Chucky Creek watershed, nonpoint source sediment and agrochemical discharges may pose a threat to the Chucky madtom by altering the physical characteristics of its habitat, thus potentially impeding its ability to feed, seek shelter from predators, and successfully reproduce. The City of Greeneville also discharges sediments and contaminants into the creek, thereby threatening the Chucky madtom. Wood and Armitage (1997, pp. 211–212) identify at least five impacts of sedimentation on fish, including: (1) Reduction of growth rate, disease tolerance, and gill function; (2) reduction of spawning habitat and egg, larvae, and juvenile development; (3) modification of migration patterns; (4) reduction of food availability through the blockage of primary production; and (5) reduction of foraging efficiency.

Water quality is important to the persistence of the Chucky madtom. The species requires relatively clean, cool, flowing water to successfully complete its life cycle, but specific water quality requirements (such as temperature, dissolved oxygen, pH, and conductivity) that define suitable habitat conditions for the Chucky madtom have not



been determined. In general, optimal water quality conditions for fishes and other aquatic organisms are characterized by moderate stream temperatures and acceptable dissolved oxygen concentrations, and they lack harmful levels of pollutants, such as inorganic contaminants like iron, manganese, selenium, and cadmium; organic contaminants such as human and animal waste products; pesticides and herbicides; nitrogen, potassium, and phosphorus fertilizers; and petroleum distillates.

As relatively sedentary animals, madtoms must tolerate the full range of such parameters that occur naturally within the streams where they persist. Both the amount of water (flow) and its physical and chemical conditions (water quality) vary widely according to seasonal precipitation events and seasonal human activities within the watershed. In general, the species survives in areas where the magnitude, frequency, duration, and seasonality of water flow is adequate to remove fine particles and sediments (silt-free) without causing degradation, and where water quality is adequate for year-round survival (for example, moderate to high levels of dissolved oxygen, low to moderate input of nutrients, and relatively unpolluted water and sediments). Relatively silt-free is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact to the species.

Therefore, based on the information above, we identify aquatic macroinvertebrate prey items; cool, clean, flowing water; shallow depths; permanent surface flows, as measured during average rainfall years; and adequate water quality with substrates that are relatively silt-free to be an essential physical or biological feature for the Chucky madtom.

## Laurel Dace

The laurel dace's preferred prey items include fly larvae, stonefly larvae, and caddisfly larvae (Skelton 2001, p. 126). Skelton observed that the morphological feeding traits of laurel dace, including a large mouth, short digestive tract, reduced number of pharyngeal (located within the throat) teeth, and primitively shaped basioccipital bone (bone that articulates the vertebra), are consistent with a diet consisting largely of animal material.

Strange and Skelton (2005, p. 7 and Appendix 2) identified siltation as a threat in all of the occupied Piney River tributaries (Youngs, Moccasin, and Bumbee Creeks). The Bumbee Creek type locality for the laurel dace is located within industrial forest that has been subjected to extensive clear-cutting and road construction in close proximity to the stream. Strange and Skelton (2005, p. 7) noted a heavy sediment load at this locality and commented that conditions there in 2005 had deteriorated since the site was visited by Skelton in 2002. In general, the species occupies areas that are relatively silt-free. Relatively silt-free is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact to the species.

Strange and Skelton (2005, pp. 7 and 8 and Appendix 2) also commented on excessive siltation in localities they sampled on Youngs and Moccasin creeks, and observed localized removal of riparian vegetation around residences in the headwaters of each of these streams. They considered the removal of riparian vegetation problematic not only for the potential for increased siltation, but also for the potential thermal alteration of these small headwater streams. Skelton (2001, p. 125) reported that laurel

dace occupy cool streams with a maximum recorded temperature of 26 °C (78.8 °F). The removal of riparian vegetation could potentially increase temperatures above the laurel dace's maximum tolerable limit.

Water quality is important to the persistence of the laurel dace. The species requires relatively clean, cool, flowing water to successfully complete its life cycle, but specific water quality requirements (such as temperature, dissolved oxygen, pH, and conductivity) that define suitable habitat conditions for the laurel dace have not been determined. In general, optimal water quality conditions for fishes and other aquatic organisms are characterized by moderate stream temperatures and acceptable dissolved oxygen concentrations, and they lack harmful levels of pollutants, such as inorganic contaminants like iron, manganese, selenium, and cadmium; organic contaminants such as human and animal waste products; pesticides and herbicides; nitrogen, potassium, and phosphorus fertilizers; and petroleum distillates.

Other factors that can potentially alter water quality and quantity are droughts and periods of low flow, nonpoint source run-off from adjacent land surfaces (for example, excessive amounts of nutrients, pesticides, and sediment), and random spills or unregulated discharge events. Run-off or discharges could be particularly harmful during drought conditions when flows are depressed and pollutants are more concentrated. Adequate water quality is essential for normal behavior, growth, and viability during all life stages of the laurel dace. Adequate water quantity and flow and good to optimal water quality are essential for normal behavior, growth, and viability during all life stages. Culverts, pipes, and bridge or road maintenance sites within the watersheds serve as dispersal barriers and have altered stream flows from natural conditions.

Other nonpoint source pollutants that affect the laurel dace include domestic sewage (through septic tank leakage or straight pipe discharges) and agricultural pollutants such as fertilizers, pesticides, herbicides, and animal waste. There are no active coal mines within the range of the laurel dace; however, coal mining represents a potential threat to the species in the foreseeable future. Coal mining represents a major source of nonpoint source pollutants because it has the potential to contribute high concentrations of dissolved metals and other solids that lower stream pH or lead to elevated levels of stream conductivity (Pond 2004, pp. 6–7, 38–41; Mattingly *et al.* 2005, p. 59). The direct effect of elevated stream conductivity on fishes, including the laurel dace, is poorly understood, but some species, such as blackside dace, have shown declines in abundance over time as conductivity increased in streams affected by mining (Hartowicz 2008, pers. comm.).

Water temperature may also be a limiting factor in the distribution of this species (Skelton 1997, pp. 17, 19). Canopy cover of laurel dace streams often consists of eastern hemlock (*Tsuga canadensis*), mixed hardwoods, pines (*Pinus* sp.), and mountain laurel (*Kalmia latifolia*). The hemlock woolly adelgid (*Adelges tsugae*) is a nonnative insect that infests hemlocks, causing damage or death to trees. The hemlock woolly adelgid was recently found in Hamilton County, Tennessee, and could impact eastern hemlock in floodplains and riparian buffers along laurel dace streams in the future (Simmons 2008, pers. comm.). Riparian buffers filter sediment and nutrients from overland runoff, allow water to soak into the ground, protect stream banks and lakeshores, and provide shade for streams. Because eastern hemlock is primarily found in riparian areas, the loss of this species adjacent to laurel dace streams would be detrimental to fish habitat.

Therefore, based on the information above, we identify aquatic macroinvertebrate prey items; cool, clean, flowing water; shallow depths; permanent surface flows, as measured during average rainfall years; and adequate water quality with substrates that are relatively silt-free to be an essential physical or biological feature for the laurel dace.

#### *Cover or Shelter*

##### Cumberland Darter

Cumberland darters depend on specific habitats and bottom substrates for normal life processes such as spawning, rearing, resting, and foraging. As described above, the species' preferred habitats (shallow pools and runs) are dominated by sand or sand-covered bedrock with patches of gravel or debris (Thomas 2007, p. 4). Individuals were observed by O'Bara (1991, p. 10) and Thomas (2007, p. 4) in gently flowing runs or pools at depths ranging from 20 to 76 cm (average 36.2 cm) (3.9 to 30 in, average 14.3 in). Most of these habitats contain isolated boulders and large cobble that the species likely uses as cover. According to O'Bara (1991, p. 11), areas used by the Cumberland darter for cover and shelter are very susceptible to the effects of siltation, and the presence of relatively silt-free substrates is the major limiting factor for both the species' continued existence and its ability to colonize new habitats. Relatively silt-free is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact to the species.

Therefore, based on the information above, we identify stable, shallow pools and runs with relatively silt-free sand, sand-covered bedrock substrates, and isolated boulders

and large cobble substrates to be an essential physical or biological feature for the Cumberland darter.

#### Rush Darter

Rush darters depend on specific stream substrates and stream margins consisting of aquatic vegetation for normal and robust life processes such as spawning, rearing, protection of young, protection of adults when threatened, foraging, and feeding. Preferred substrates are dominated by fine gravel, with lesser amounts of sand, fine silt, coarse gravel, cobble, and bedrock (Blanco and Mayden 1999, pp. 24–26; Drennen 2009, pers. obs.). In addition to these preferred substrates, rush darters generally prefer aquatic emergent vegetation such as watercress (*Nasturtium officinale*), parrots feather (*Myriophyllum* sp.), rushes (*Juncus* spp.), sedges (*Carex* spp.), burr reed (*Sparganium* sp.), and coontail (*Ceratophyllum* sp.). This emergent vegetation is utilized by the rush darter, especially in the quiet water along stream margins and in ephemeral pools and tributaries (Boschung and Mayden 2004, p. 552; Stiles 2011, pers. comm.).

Excessive siltation of gravel substrates removes foraging and feeding sites for the rush darter (Sylte and Fischenich 2002, pp. 1–25), and eliminates conditions necessary for some aquatic plant species to flourish. Similarly, excessive nutrients promote dense filamentous algae growth on the substrate and within the water column (Drennen 2007, pers. obs.; Stiles 2011, pers. comm.), which may restrict rush darter habitat for foraging and spawning (Stiles 2011, pers. comm.).

Stormwater flows may result in scouring and erosion of important cover, breeding, and sheltering sites for the rush darter. Conversely, drought conditions render

the darter populations vulnerable to higher water temperatures and restricted habitat, especially during the breeding season when they concentrate in wetland pools and shallow pools of headwater streams (Fluker *et al* 2007, p. 10).

Therefore, based on the information above, we identify quiet water along stream margins and in shallow ephemeral pools and headwater tributaries; aquatic emergent vegetation; a combination of silt, sand, and gravel substrates; and seasonal stream flows sufficient to provide connectivity and to remove excessive sediment covering the vegetation and stream bottom substrates to be an essential physical or biological feature for the rush darter.

#### Yellowcheek Darter

Summertime habitat selected by the yellowcheek darter includes high-velocity (greater than 0.4 meters per second or 1.3 feet per second) water over 8 to 128 millimeters (mm) (0.3 to 5.0 in) gravel and cobble substrate at depths of 11 to 30 cm (4.3 to 11.8 in) (Brophy and Stoeckel 2006, p. 42), which lends evidence to the suggestion by other researchers that it is a “riffle-obligate” species and is unlikely to occupy pool or run habitats when riffles are available. Preferred water depths for yellowcheek darters ranged between 11 and 30 cm (4.3 and 11.8 in), but yellowcheek darters have been found in shallower water, when greater depths with suitable velocities were scarce. Gravel and cobble from 8 to 128 mm (0.3 to 5.0 in) median diameter appears to be the important substrate type for yellowcheek darter (Brophy and Stoeckel 2006, p. 42). Larger boulder substrates are important during spring spawning periods (McDaniel 1984, p. 82). Siltation (excess sediments suspended or deposited in a stream) contributes to turbidity of

the water and has been shown to suffocate aquatic insects, smother fish eggs, clog fish gills, and may fill in essential interstitial spaces (spaces between stream substrates) used by aquatic organisms for spawning and foraging; therefore, excessive siltation negatively impacts fish growth, physiology, behavior, reproduction, and survival. In general, the species occupies areas that are relatively silt-free. Relatively silt-free is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact to the species.

Therefore, based on the information above, we identify high-quality riffle substrates that are relatively silt-free and contain a mixture of gravel, cobble, and boulder substrates to be an essential physical or biological feature for the yellowcheek darter.

#### Chucky Madtom

While nothing is known specifically about Chucky madtom habitat preferences, available information for other similar members of the *Noturus* group is known. Both smoky and elegant madtoms (*N. elegans*) were found to nest under flat rocks (slab-rock boulders) at or near the head of riffles (Burr and Dimmick 1981, p. 116; Dinkins and Shute 1996, p. 56). Smoky madtoms have also been observed using shallow pools and to select rocks of larger dimension for nesting than were used for shelter during other times of year (Dinkins and Shute 1996, p. 56). Siltation (excess sediments suspended or deposited in a stream) contributes to turbidity of the water and has been shown to smother fish eggs, clog fish gills, and may fill in essential interstitial spaces (spaces between stream substrates) used by aquatic organisms for spawning and foraging;



therefore, excessive siltation negatively impacts fish growth, physiology, behavior, reproduction, and survival.

Dinkins and Shute (1996, p. 50) found smoky madtoms underneath slab-rock boulders in swift to moderate current during May to early November. Habitat use shifted to shallow pools over the course of a 1-week period, coinciding with a drop in water temperature to 7 or 8 °C (45 to 46 °F), and persisted from early November to May. Eisenhour *et al.* (1996, p. 43) collected saddled madtoms in gravel, cobble, and slab-rock boulder substrates in riffle habitats with depths ranging from 0.1 to 0.3 m (0.33 to 0.98 ft). Based on their limited number of observations, Eisenhour *et al.* (1996, p. 43) hypothesized that saddled madtoms occupy riffles and runs in the daylight hours and then move to pools at night and during crepuscular hours (dawn and dusk) to feed.

Therefore, based on the information above, we identify gently flowing runs and pools with relatively silt-free flat gravel, cobble, and slab-rock boulder substrates to be an essential physical or biological feature for the Chucky madtom.

#### Laurel Dace

Laurel dace have been most often collected from pools or slow runs from undercut banks or beneath slab-rock boulders, typically in first- or second- order, clear, cool (maximum recorded temperature 26 °C or 78.8 °F) streams. Substrates in streams where laurel dace are found typically consist of a mixture of cobble, rubble, and boulder, and the streams tend to have a dense riparian zone consisting largely of mountain laurel (Skelton 2001, pp. 125–126). Siltation (excess sediments suspended or deposited in a stream) contributes to turbidity of the water and has been shown to smother fish eggs,

clog fish gills, and may fill in essential interstitial spaces (spaces between stream substrates) used by aquatic organisms for spawning and foraging; therefore, excessive siltation negatively impacts fish growth, physiology, behavior, reproduction, and survival.

Water temperature may be a limiting factor in the distribution of this species (Skelton 1997, pp. 17, 19). Canopy cover of laurel dace streams often consists of eastern hemlock (*Tsuga canadensis*), mixed hardwoods, pines (*Pinus* spp.), and mountain laurel (*Kalmia latifolia*). Riparian buffers filter sediment and nutrients from overland runoff, allow water to soak into the ground, protect stream banks and lakeshores, and provide shade for streams. The hemlock woolly adelgid is a nonnative insect that infests hemlocks, causing damage or death to trees. The woolly adelgid was recently found in Hamilton County, Tennessee, and could impact eastern hemlock in floodplains and riparian buffers along laurel dace streams in the future (Simmons 2008, pers. comm.). Because eastern hemlock is primarily found in riparian areas, the loss of this species adjacent to laurel dace streams would be detrimental to fish habitat.

Habitat destruction and modification also stem from existing or proposed infrastructure development in association with silvicultural activities. The presence of culverts at one or more road crossings in most of the streams inhabited by laurel dace may disrupt upstream dispersal within those systems (Chance 2008, pers. obs.). Such dispersal barriers could prevent re-establishment of laurel dace populations in reaches where they suffer localized extinctions due to natural or human-caused events.

Therefore, based on the information above, we identify stream connectivity, gently flowing runs and pools with relatively silt-free cobble and slab-rock boulder

substrates with undercut banks, and canopy cover to be an essential physical or biological feature for the laurel dace.

*Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring*

Cumberland Darter

Little is known regarding the reproductive habits of the Cumberland darter.

Thomas (2007, p. 4) reported the collection of male Cumberland darters in breeding condition in April and May, with water temperatures ranging from 15 to 18 °C (59 to 64 °F). Extensive searches by Thomas (2007, p. 4) produced no evidence of nests or eggs at these sites. Reproductive habits of its closest relative, the Johnny darter, have been well studied by Winn (1958a, pp. 163–183; 1958b, pp. 205–207), Speare (1965, pp. 308–314), and Bart and Page (1991, pp. 80–86). Spawning occurs from April to June, with males migrating to spawning areas prior to females and establishing territories at selected spawning sites. Males establish a nest under a submerged object (boulder or woody debris) by using fin movements to remove silt and fine debris. Females enter the nests, the spawning pair inverts, and females deposit between 40 and 200 adhesive eggs on the underside of the nest object. Males care for the nest by periodically fanning the area to remove silt. The eggs hatch in about 6 to 16 days, depending on water temperature. Hatchlings are about 5 mm (0.2 in) and reach 29 to 38 mm (1.1 to 1.5 in) at age 1. Given these specialized reproductive behaviors, it is apparent that the Cumberland darter requires second- to fourth-order streams containing gently flowing run and pool habitats with sand and bedrock substrates, boulders, woody debris, or other cover and that are relatively silt-free. It is essential to maintain the connectivity of these sites, to

accommodate breeding, growth, and other normal behaviors of the Cumberland darter and to promote gene flow within the species.

Therefore, based on the information above, we identify stable, second- to fourth-order streams containing gently flowing run and pool habitats with sand and bedrock substrates, boulders, large cobble, woody debris, or other cover and that are relatively silt-free and stream connectivity to be an essential physical or biological feature for the Cumberland darter.

#### Rush Darter

Rush darters depend on bottom substrates dominated by sand, fine silt, fine gravel and some coarse gravel, and that have significant amounts of emergent aquatic and overhanging terrestrial vegetation (Drennen 2009, pers. obs.).

In July 2008, rush darter young-of-the-year were collected within areas of very little water in the headwaters of an unnamed tributary in Jefferson County (Kuhajda 2008, pers. comm.), and in January 2008, the same tributary was dry. In previous years, this area was a spawning and nursery site for rush darters (Kuhajda 2008, pers. comm.). During May and June, rush darters spawned at this site even though the area had been dewatered occasionally in the summer, fall, and winter (Kuhajda 2008, pers. comm.). Adult rush darters are present in headwater areas for spawning during May and June, and may leave these sites or become trapped in ephemeral pools during the summer. Adults may be migrating upstream from watered areas, or juveniles and adults may be moving downstream from the spring-fed wetland that constitutes the headwaters of the unnamed tributary (Kuhajda 2008, pers. comm.).

Therefore, based on the information above, we identify permanent and ephemeral shallow streams with quiet water along stream margins and in shallow ephemeral pools and headwater tributaries, along with seasonal stream flows sufficient to provide connectivity and refugia to promote the emergent aquatic vegetation necessary for spawning and rearing of young, to be an essential physical or biological feature for the rush darter.

#### Yellowcheek Darter

Yellowcheek darter spawning occurs from late May through June in the swift to moderately swift portions of riffles, often around or under the largest rocks (McDaniel 1984, p. 82), although brooding females have been found at the head of riffles in smaller gravel substrate (Wine *et al.* 2000, p. 3). During non-spawning months, there is a general movement to portions of the riffle with smaller substrate, such as gravel or cobble, and less turbulence (Robison and Harp 1981, p. 3). Weston and Johnson (2005, p. 24) observed that the yellowcheek darter moved very little during a 1-year migration study, with 19 of 22 recaptured darters found within 9 m (29.5 ft) of their original capture position after periods of several months.

A number of life-history characteristics, including courtship patterns, specific spawning behaviors, egg deposition sites, number of eggs per nest, degree of nest protection by males, and degree of territoriality, are unknown at this time; however, researchers suggest that yellowcheek darters deposit eggs on the undersides of larger rubble in swift water (McDaniel 1984, p. 82). Wine and Blumenshine (2002, p. 10) noted that during laboratory spawning, yellowcheek darter females bury themselves in fine

gravel or sand substrates (often behind large, fist-sized cobble) with only their heads and caudal fin exposed. A yellowcheek darter male will then position himself upstream of the buried female and fertilize her eggs. Clutch size and nest defense behavior were not observed. Given these specialized reproductive behaviors, the importance of riffle habitats that are characterized by good water quality and sufficient substrates that are relatively silt-free is apparent.

Therefore, based on the information above, we identify swift to moderately swift riffles with gravel, cobble, and boulder substrates that are characterized by good water quality and are relatively silt-free to be an essential physical or biological feature for the yellowcheek darter.

#### Chucky Madtom

Little is known regarding the reproductive habits of the Chucky madtom; however, both smoky and elegant madtoms were found to nest under flat slab-rock boulders at or near the head of riffles (Burr and Dimmick 1981, p. 116; Dinkins and Shute 1996, p. 56). Shallow pools were also used by the smoky madtom. Smoky madtoms selected larger rocks for nesting than were used for shelter during other times of year (Dinkins and Shute 1996, p. 56). A single male madtom guards the nest in the cases of smoky, elegant, Ozark (*Noturus albater*), and least madtoms (Mayden *et al.* 1980, p. 337; Burr and Dimmick 1981, p. 116; Mayden and Walsh 1984, p. 357; Dinkins and Shute 1996, p. 56). While guarding the nest, many were found to have empty stomachs suggesting that they do not feed during nest guarding, which can last as long as 3 weeks.

Siltation (excess sediments suspended or deposited in a stream) contributes to turbidity of the water and has been shown to smother fish eggs, clog fish gills, and may fill in essential interstitial spaces (spaces between stream substrates) used by aquatic organisms for spawning and foraging; therefore, excessive siltation negatively impacts fish growth, physiology, behavior, reproduction, and survival.

Therefore, based on the information above, we identify streams containing gently flowing run and pool habitats with flat or slab-rock boulder substrates that are relatively silt-free to be an essential physical or biological feature for the Chucky madtom.

#### Laurel Dace

Little is known regarding the reproductive habits of the laurel dace. Skelton (2001, p. 126) reported having collected nuptial individuals from late March until mid-June, although Call (2004, pers. obs.) observed males in waning nuptial color during surveys on July 22, 2004. Laurel dace may be a spawning nest associate with nest-building minnow species, as has been documented in blackside dace (Starnes and Starnes 1981, p. 366). Soddy Creek is the only location in which Skelton (2001, p. 126) collected a nest-building minnow with laurel dace. Skelton (2001, p. 127) observed laurel dace burying their noses in the gravel of largescale stoneroller (*Campostoma oligolepis*) nests. The nests used by blackside dace had moderate flow and consisted of gravel substrate at depths of 20 cm (7.9 in) (Starnes and Starnes 1981, p. 366). These nests were noted to be approximately 0.7 m (2.3 ft) from undercut banks (Starnes and Starnes 1981, p. 366).

Siltation (excess sediments suspended or deposited in a stream) contributes to turbidity of the water and has been shown to smother fish eggs, clog fish gills, and may

fill in essential interstitial spaces (spaces between stream substrates) used by aquatic organisms for spawning and foraging; therefore, excessive siltation negatively impacts fish growth, physiology, behavior, reproduction, and survival.

Therefore, based on the information above, we identify headwater streams containing moderately flowing run and pool habitats with gravel substrates, containing undercut banks, and that are relatively silt-free to be an essential physical or biological feature for the laurel dace.

### **Primary Constituent Elements**

Under the Act and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace in areas occupied at the time of listing, focusing on the features' primary constituent elements. Primary constituent elements are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

Based on our current knowledge of the physical or biological features and habitat characteristics required to sustain the five species' life history processes, we determine that the primary constituent elements specific to these five fishes are:

Cumberland darter



(1) Primary Constituent Element 1 – Shallow pools and gently flowing runs of geomorphically stable, second- to fourth-order streams with connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(2) Primary Constituent Element 2 – Stable bottom substrates composed of relatively silt-free sand and sand-covered bedrock, boulders, large cobble, woody debris, or other cover.

(3) Primary Constituent Element 3 – An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(4) Primary Constituent Element 4 – Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the Cumberland darter.

(5) Primary Constituent Element 5 – Prey base of aquatic macroinvertebrates, including midge larvae, mayfly nymphs, caddisfly larvae, and microcrustaceans.

Rush Darter

(1) Primary Constituent Element 1 – Springs and spring-fed reaches of geomorphically stable, relatively low-gradient, headwater streams with appropriate habitat (bottom substrates) to maintain essential riffles, runs, and pools; emergent vegetation in shallow water and on the margins of small streams and spring runs; cool, clean, flowing water; and connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(2) Primary Constituent Element 2 – Stable bottom substrates consisting of a combination of sand with silt, muck, gravel, or bedrock and adequate emergent vegetation in shallow water on the margins of small permanent and ephemeral streams and spring runs.

(3) Primary Constituent Element 3 – Instream flow with moderate velocity and a continuous daily discharge that allows for a longitudinal connectivity regime inclusive of both surface runoff and groundwater sources (springs and seepages) and exclusive of flushing flows caused by stormwater runoff.

(4) Primary Constituent Element 4 – Water quality with temperature not exceeding 26.7 °C (80 °F), dissolved oxygen 6.0 milligrams or greater per liter (mg/L), turbidity of an average monthly reading of 10 Nephelometric Turbidity Units (NTU; units used to measure sediment discharge) and 15mg/L total suspended solids (TSS; measured as mg/L of sediment in water) or less; and a specific conductance (ability of water to

conduct an electric current, based on dissolved solids in the water) of no greater than 225 micro Siemens per centimeter at 26.7 °C (80 °F).

(5) Primary Constituent Element 5 – Prey base of aquatic macroinvertebrates, including midge larvae, mayfly nymphs, blackfly larvae, beetles, and microcrustaceans.

#### Yellowcheek Darter

(1) Primary Constituent Element 1 – Geomorphically stable, second- to fifth-order streams with riffle habitats, and connectivity between spawning, foraging, and resting sites to promote gene flow within the species' range where possible.

(2) Primary Constituent Element 2 – Stable bottom composed of relatively silt-free, moderate to strong velocity riffles with gravel, cobble, and boulder substrates.

(3) Primary Constituent Element 3 – An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(4) Primary Constituent Element 4 – Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of

this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the yellowcheek darter.

(5) Primary Constituent Element 5 – Prey base of aquatic macroinvertebrates, including blackfly larvae, stonefly larvae, mayfly nymphs, and caddisfly larvae.

#### Chucky Madtom

(1) Primary Constituent Element 1 – Gently flowing run and pool reaches of geomorphically stable streams with cool, clean, flowing water; shallow depths; and connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(2) Primary Constituent Element 2 – Stable bottom substrates composed of relatively silt-free, flat gravel, cobble, and slab-rock boulders.

(3) Primary Constituent Element 3 – An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(4) Primary Constituent Element 4 – Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of

this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the Chucky madtom.

(5) Primary Constituent Element 5 – Prey base of aquatic macroinvertebrates, including midge larvae, mayfly nymphs, caddisfly larvae, and stonefly larvae.

Laurel Dace

(1) Primary Constituent Element 1 – Pool and run habitats of geomorphically stable, first- to second-order streams with riparian vegetation; cool, clean, flowing water; shallow depths; and connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(2) Primary Constituent Element 2 – Stable bottom substrates composed of relatively silt-free gravel, cobble, and slab-rock boulder substrates with undercut banks and canopy cover. (3) Primary Constituent Element 3 – An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(4) Primary Constituent Element 4 – Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of

this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the laurel dace.

(5) Primary Constituent Element 5 – Prey base of aquatic macroinvertebrates, including midge larvae, caddisfly larvae, and stonefly larvae.

With this designation of critical habitat, we intend to identify the physical or biological features essential to the conservation of these five species, through the identification of the features' primary constituent elements sufficient to support life-history processes of these species.

#### *Special Management Considerations or Protection*

When designating critical habitat, we assess whether the areas within the geographical area occupied by the species at the time of listing contain features that are essential to the conservation of the species and which may require special management considerations or protection.

#### **Cumberland Darter**

The 15 units we are designating as critical habitat for the Cumberland darter will require some level of management to address the current and future threats to the physical and biological features of the species. Due to their location on the Daniel Boone National Forest (DBNF), at least a portion of 13 of the 15 critical habitat units are being managed

and protected under DBNF's Land and Resource Management Plan (LRMP) (United States Forest Service (USFS) 2004, pp. 1–14). The LRMP is implemented through a series of project-level decisions based on appropriate site-specific analysis and disclosure. It does not contain a commitment to select any specific project; rather, it sets up a framework of desired future conditions with goals, objectives, and standards to guide project proposals. Projects are proposed to solve resource management problems, move the forest environment toward desired future conditions, and supply goods and services to the public (USFS 2004, pp. 1–14). The LRMP contains a number of protective standards that in general are designed to avoid and minimize potential adverse effects to the Cumberland darter and other federally listed species; however, the DBNF will continue to conduct project-specific section 7 consultation under the Act when their activities may adversely affect streams supporting Cumberland darters.

Two of the 15 critical habitat units are located entirely on private property and are not presently under the special management or protection provided by a legally operative plan or agreement for the conservation of the species. Activities in or adjacent to these 15 critical habitat areas may affect one or more of the physical and biological features essential to the Cumberland darter. For example, features in this critical habitat designation may require special management due to threats posed by resource extraction (coal surface mining, silviculture, natural gas and oil exploration activities), agricultural activities (livestock), lack of adequate riparian buffers, presence of perched road culverts or impassable road crossings that restrict fish movement, construction and maintenance of State and county roads, nonpoint source pollution arising from stormwater runoff, and canopy loss caused by infestations of the hemlock woolly adelgid. These threats are in

addition to adverse effects of drought, floods, or other natural phenomena. Other activities that may affect physical and biological features in the critical habitat units include those listed in the **Effects of Critical Habitat Designation** section below.

Management activities that could ameliorate these threats include, but are not limited to: Use of BMPs designed to reduce sedimentation, erosion, and bank side destruction; moderation of surface and ground water withdrawals to maintain natural flow regimes; increase of stormwater management and reduction of stormwater flows into the systems; preservation of headwater springs and streams; regulation of off-road vehicle use; removal or replacement of perched culverts or fords that can restrict darter movements and reduce genetic exchange between populations; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

In summary, we find that the areas we are designating as critical habitat for the Cumberland darter contain the physical or biological features for the species, and that these features may require special management considerations or protection. Special management consideration or protection may be required to eliminate, or to reduce to negligible levels, the threats affecting the physical or biological features of each unit.

#### Rush Darter

The eight units we are designating as critical habitat for the rush darter will require some level of management to address the current and future threats to the physical and biological features of the rush darter. None of the critical habitat units (or their corresponding aquifer recharge zones, which are not designated as critical habitat) are



presently under special management or protection provided by a legally operative plan or agreement for the conservation of the rush darter. However, 4.7 rkm (2.9 rmi) of the Turkey Creek watershed (Jefferson County) is designated critical habitat for the vermilion darter (*Etheostoma chermocki*) (75 FR 75913, December 7, 2010) which includes a portion of rush darter unit 2. Various activities in or adjacent to the critical habitat units described in this final rule may affect one or more of the physical and biological features. For example, features in the critical habitat designation may require special management due to threats posed by the following activities or disturbances: Urbanization activities and inadequate stormwater management (such as stream channel modification for flood control or gravel extraction) that could cause an increase in bank erosion; significant changes in the existing flow regime within the streams due to water diversion or withdrawal; significant alteration of water quality; significant alteration in the quantity of groundwater, prevention of water from percolating into the aquifer recharge zone, and alteration of spring discharge sites; significant changes in stream bed material composition and quality due to construction projects and maintenance activities; off-road vehicle use; sewer, gas, and water easements; bridge construction; culvert and pipe installation; and other watershed and floodplain disturbances that release sediments or nutrients into the water. Other activities that may affect physical and biological features in the critical habitat units include those listed in the **Effects of Critical Habitat Designation** section below.

Management activities that could ameliorate these threats include, but are not limited to: Use of BMPs designed to reduce sedimentation, erosion, and bank side destruction; moderation of surface and ground water withdrawals to maintain natural

flow regimes; increase of stormwater management and reduction of stormwater flows into the systems; preservation of headwater springs, spring runs, and ephemeral rivulets; regulation of off-road vehicle use; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

In summary, we find that the areas we are designating as critical habitat for the rush darter contain the physical or biological features for the species, and that these features may require special management considerations or protection. Special management consideration or protection may be required to eliminate, or to reduce to negligible levels, the threats affecting the physical or biological features of each unit.

#### Yellowcheek Darter

The four units we are designating as critical habitat for the yellowcheek darter will require some level of management to address the current and future threats to the physical and biological features of the species. The yellowcheek darter is currently covered under a candidate conservation agreement with assurances (CCAA) in the upper Little Red River watershed in Arkansas, along with the endangered speckled pocketbook mussel, which does not have critical habitat designated. Of the 205,761 hectares (ha) (508,446 acres (ac)) within the upper Little Red River watershed known to support the yellowcheek darter, approximately 35,208 ha (87,000 ac) are owned by private parties (Service 2007, p. 4). To date, multiple landowners have enrolled 4,672 ha (11,544 ac) in the program since its inception in mid-2007, and 10 more landowners with approximately 20,234 ha (50,000 ac) have pending draft agreements. Lands enrolled in these conservation programs include areas within the critical habitat as well as riparian and

upland areas that are outside of the critical habitat boundary. Various activities in or adjacent to critical habitat may affect one or more of the physical and biological features. For example, features in this critical habitat designation may require special management due to threats posed by natural gas extraction; timber harvest; gravel mining; unrestricted cattle access into streams; water diversion for agriculture, industry, municipalities, or other purposes; lack of adequate riparian buffers; construction and maintenance of county and State roads; and nonpoint source pollution arising from development and a broad array of human activities. These threats are in addition to random effects of drought, floods, or other natural phenomena. Other activities that may affect physical and biological features in the critical habitat units include those listed in the **Effects of Critical Habitat Designation** section below.

Management activities that could ameliorate these threats include, but are not limited to: Use of BMPs designed to reduce sedimentation, erosion, and bank side destruction; moderation of surface and ground water withdrawals to maintain natural flow regimes; increase of stormwater management and reduction of stormwater flows into the systems; preservation of headwater springs and streams; regulation of off-road vehicle use; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

In summary, we find that the areas we are designating as critical habitat for the yellowcheek darter contain the physical or biological features for the species, and that these features may require special management considerations or protection. Special management consideration or protection may be required to eliminate, or to reduce to negligible levels, the threats affecting the physical or biological features of each unit.

## Chucky Madtom

The single unit we are designating as critical habitat for the Chucky madtom will require some level of management to address the current and future threats to the physical and biological features of the species. The critical habitat unit is located on private property and is not presently under the special management or protection provided by a legally operative plan or agreement for the conservation of the species. Various activities in or adjacent to the critical habitat unit described in this rule may affect one or more of the physical and biological features. For example, features in this critical habitat designation may require special management due to threats posed by agricultural activities (e.g., row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, gravel mining, and nonpoint source pollution (e.g., agrochemicals, sediment) arising from a wide variety of human activities. These threats are in addition to random effects of drought, floods, or other natural phenomena. Other activities that may affect physical and biological features in the critical habitat unit include those listed in the **Effects of Critical Habitat Designation** section below.

Management activities that could ameliorate these threats include, but are not limited to: Use of BMPs designed to reduce sedimentation, erosion, and bank side destruction; moderate application of agrochemicals; moderation of surface and ground water withdrawals to maintain natural flow regimes; increase of stormwater management and reduction of stormwater flows into the systems; preservation of headwater streams; and reduction of other watershed and floodplain disturbances that release sediments, pollutants, or nutrients into the water.

In summary, we find that the area we are designating as critical habitat for the Chucky madtom contains the physical or biological features for the species, and that these features may require special management considerations or protection. Special management consideration or protection may be required to eliminate, or to reduce to negligible levels, the threats affecting the physical or biological features of the unit.

#### Laurel Dace

The six units we are designating as critical habitat will require some level of management to address the current and future threats to the physical and biological features of the laurel dace. These units are located on private property and are not presently under the special management or protection provided by a legally operative plan or agreement for the conservation of the species. Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. For example, features in this critical habitat designation may require special management due to threats posed by resource extraction (coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid. These threats are in addition to random effects of drought, floods, or other natural phenomena. Other activities that may affect physical and biological features in the critical habitat units include those listed in the **Effects of Critical Habitat Designation** section below.

Management activities that could ameliorate these threats include, but are not

limited to: Use of BMPs designed to reduce sedimentation, erosion, and bank side destruction; moderation of surface and ground water withdrawals to maintain natural flow regimes; increase of stormwater management and reduction of stormwater flows into the systems; preservation of headwater streams; regulation of off-road vehicle use; and reduction of other watershed and floodplain disturbances that release sediments, acid mine drainage, pollutants, or nutrients into the water.

In summary, we find that the areas we are designating as critical habitat for the laurel dace contain the physical or biological features for the species, and that these features may require special management considerations or protection. Special management consideration or protection may be required to eliminate, or to reduce to negligible levels, the threats affecting the physical or biological features of each unit.

#### *Criteria Used to Identify Critical Habitat*

As required by section 4(b)(1)(A) of the Act, we used the best scientific and commercial data available to designate critical habitat. We reviewed available information pertaining to the habitat requirements of the species. In accordance with the Act and its implementing regulation at 50 CFR 424.12(e), we considered whether designating additional areas—outside those currently occupied as well as those occupied at the time of listing—are necessary to ensure the conservation of the species. We are designating critical habitat in areas within the geographical area occupied by the species at the time of listing in 2011. We also are designating specific areas outside the geographical area occupied by the Cumberland darter at the time of listing that are within

the historical range of the species, but currently unoccupied, because we have determined that such areas are essential for the conservation of the species. Below is a discussion of the criteria used to identify critical habitat for each of the five species.

#### Cumberland Darter

We are designating critical habitat in areas within the geographical area occupied by the Cumberland darter at the time of listing in 2011. We also are designating specific areas outside the geographical area occupied by the species at the time of listing that were historically occupied but are presently unoccupied, because we have determined that: (1) Such areas are essential for the conservation of the species; and (2) designation of only occupied habitats is not sufficient to conserve this species. Unoccupied habitats provide additional habitat for population expansion and promote greater genetic diversity, which will decrease the risk of extinction for the species.

We used information from surveys and reports prepared by the Kentucky Department of Fish and Wildlife Resources, Kentucky Division of Water, and Service records to identify specific locations occupied by the Cumberland darter. Delineations were based on the best available scientific information indicating portions of streams containing necessary physical or biological features to support the Cumberland darter. We set the upstream and downstream limits of each critical habitat unit by identifying landmarks (bridges, confluences, road crossings, dams) above and below the upper and lowermost reported locations of the Cumberland darter in each stream reach to ensure incorporation of all potential sites of occurrence.

We used ARCGIS to delineate the specific stream segments occupied by the Cumberland darter at the time of listing, and those locations outside the geographical area occupied by the species at the time it was listed that were determined to be essential for the conservation of the species. Areas designated as critical habitat for the Cumberland darter include only stream channels within the ordinary high water line and do not contain any developed areas or structures.

We are designating as critical habitat all stream reaches in occupied habitat. These stream reaches comprise the entire known range of the species. As discussed above, currently occupied habitat for the Cumberland darter is limited to 13 streams in McCreary and Whitley Counties, Kentucky, and Campbell and Scott Counties, Tennessee. All currently occupied areas contain the physical or biological features of the species.

To identify essential areas outside of the geographical area occupied at the time of listing, we identified areas historically occupied (currently unoccupied) in the upper Cumberland River basin in Kentucky (McCreary and Whitley Counties) and Tennessee (Campbell and Scott Counties). We then assessed the critical life-history components of the Cumberland darter, as they relate to the physical or biological features. We determined the appropriate length of stream segments by identifying the upstream and downstream limits of unoccupied sections necessary for the conservation of the Cumberland darter.

In addition, we are designating as critical habitat reaches that were not occupied by the Cumberland darter at the time of listing, but that are located within the historical range of the species. During our evaluation of unoccupied stream reaches, we considered



the availability of potential habitat throughout the historical range that may be essential to the survival and conservation of the species. We eliminated from consideration streams with degraded habitat and water quality conditions, and other streams with potentially suitable habitat but that are separated from basins with occupied habitats. This screening process produced two unoccupied stream reaches (Indian Creek and Kilburn Fork), which we are designating as critical habitat. These reaches are adjacent to currently occupied areas where there is potential for natural dispersal and reoccupation by the species.

Currently occupied habitats of the Cumberland darter are highly localized and fragmented, with populations separated from one another by an average distance of 30.5 stream km (19 stream mi). As explained above, this fragmentation and isolation of populations reduces the amount of space for rearing and reproduction, reduces the connectivity between populations, and decreases genetic diversity. Long-term viability is founded on the conservation of numerous local populations that can move freely between habitats and exchange genetic information. These reaches are essential to the Cumberland darter because they provide additional habitat for population expansion and will promote connectivity and genetic exchange between populations; in addition, both streams support diverse fish assemblages, including federally listed and at-risk species.

We are designating as critical habitat 13 units that we determined were occupied at the time of listing. These units are designated because sufficient elements of physical or biological features are present to support Cumberland darter life-history processes. Two additional units outside the geographical area occupied by the species at the time of listing are designated because we consider them to be essential to the conservation of the species.

## Rush Darter

We are designating critical habitat in areas within the geographical area occupied by the rush darter at the time of listing in 2011. We are not designating any areas outside the geographical area occupied by the rush darter because occupied areas are sufficient for the conservation of the species.

We used information from surveys and reports prepared by the Alabama Department of Conservation and Natural Resources, Alabama Geological Survey, Samford University, University of Alabama, the U.S. Forest Service, the Natural Resources Conservation Service, and the Service to identify the specific locations occupied by the rush darter. Currently, occupied habitat for the species is limited and isolated. The species is currently located within tributaries of three watersheds in three counties in Alabama: the Turkey Creek watershed (Jefferson County) (Drennen 2008, pers. obs.); the Clear Creek watershed (Winston County); and the Little Cove-Bristow Creek watershed (Etowah County). In the Turkey Creek watershed, the species is found in four tributaries including Beaver Creek, an unnamed tributary to Beaver Creek and associated springs and wetland, the Highway 79 site, and Tapawingo or Penny Springs. In the Clear Creek watershed, it is found in Wildcat Branch, Doe Branch, and Mill Creek. In the Little Cove-Bristow Creek watershed, it is found in Little Cove Creek, Cove Spring and spring run, and Bristow Creek.

Following the identification of the specific locations occupied by the rush darter, we determined the appropriate length of stream segments by identifying the upstream and downstream limits of these occupied sections necessary for the conservation of the rush

darter. Because populations of rush darters are isolated due to dispersal barriers, to set the upstream and downstream limits of each critical habitat unit, we identified landmarks (bridges, confluences, road crossings, and dams), and in some instances latitude and longitude coordinates and section lines above and below the upper and lowermost reported locations of the rush darter, in each stream reach to ensure incorporation of all potential sites of occurrence. In addition, within the Cove Spring run and Tapawingo or Penny Spring run, the total area of water that is pooled, and is rush darter habitat, was calculated in hectares (acres). The critical habitat areas were then mapped using ARCGIS to produce the critical habitat map.

We are designating as critical habitat all stream and spring reaches in occupied habitat. These stream reaches comprise the entire known range of the rush darter. We are not designating any areas outside the occupied range of the species because occupied areas are sufficient for the conservation of the species, and because the historical range of the rush darter, beyond currently occupied areas, is unknown and dispersal beyond the current range is not likely due to dispersal barriers. Areas designated for critical habitat for the rush darter below include only stream channels within the ordinary high water line and spring pool areas and do not contain any developed areas or structures.

We are designating as critical habitat eight units that we have determined were occupied at the time of listing and contain sufficient elements of physical or biological features to support life-history processes essential to the conservation of rush darter. Some units contain all of the identified elements of physical or biological features and support multiple life-history processes. Some units contain only some elements of the

physical or biological features necessary to support the rush darter's particular use of that habitat.

#### Yellowcheek Darter

We are designating critical habitat in areas within the geographical area occupied by the yellowcheek darter at the time of listing in 2011. We are not designating any areas outside the geographical area occupied by the yellowcheek darter because occupied areas are sufficient for the conservation of the species.

We used information from surveys and reports prepared by Arkansas State University, Arkansas Tech University, Arkansas Game and Fish Commission, Arkansas Department of Environmental Quality, and the Service to identify the specific locations occupied by the yellowcheek darter. We identified those areas for designation as critical habitat, within the geographical area occupied by the species at the time of listing, that contain the physical or biological features of the yellowcheek darter and which may require special management consideration or protection. All of the areas we are designating are currently part of ongoing recovery initiatives for this species and are targeted for special management considerations.

We used ARCGIS to delineate the specific stream segments occupied by the yellowcheek darter at the time of listing, which contain the physical or biological features essential to the species. We assessed the critical life-history components of the yellowcheek darter, as they relate to habitat. Delineations were based on the best available scientific information indicating portions of streams containing necessary physical or biological features necessary to support the yellowcheek darter. We set the

upstream and downstream limits of each critical habitat unit by identifying landmarks (bridges, confluences, road crossings, dams, reservoir inundation elevations) above and below the upper and lowermost reported locations of the yellowcheek darter in each stream reach to ensure incorporation of all potential sites of occurrence. Areas designated as yellowcheek darter critical habitat include only stream channels within the ordinary high water line and do not contain any developed areas or structures.

We are designating as critical habitat four units that we have determined were occupied at the time of listing and contain sufficient elements of physical or biological features to support life-history processes essential to the conservation of the yellowcheek darter. All units contain all of the identified elements of physical or biological features and support multiple life-history processes.

#### Chucky Madtom

We are designating critical habitat in areas within the geographical area occupied by the Chucky madtom at the time of listing in 2011. We are not designating any areas outside the geographical areas occupied by the Chucky madtom at the time of listing because the historical range, beyond currently occupied areas, is not well known.

We used information from surveys and reports prepared by Conservation Fisheries, Inc., and the Tennessee Valley Authority to identify the specific locations occupied by the Chucky madtom. Currently, occupied habitat for the species is limited and isolated. At the time of listing, the current range of the Chucky madtom was restricted to an approximately 3-km (1.8-mi) reach of Little Chucky Creek in Greene County, Tennessee.

Following the identification of the specific locations occupied by the Chucky madtom, we determined the appropriate length of stream segments by identifying the upstream and downstream limits of these occupied sections necessary for the conservation of the species. To set the upstream and downstream limits of the single critical habitat unit, we identified landmarks (bridges, confluences, and road crossings) above and below the upper and lowermost reported locations of the Chucky madtom in Little Chucky Creek to ensure incorporation of all potential sites of occurrence. The critical habitat areas were then mapped using ARCGIS to produce the critical habitat unit map.

We are designating as critical habitat a single stream reach in Little Chucky Creek, which is occupied habitat. This stream reach comprises the entire current known range of the Chucky madtom. The unit contains one or more of the physical or biological features in the appropriate quantity and spatial arrangement essential to the conservation of this species and supports multiple life-history processes for the Chucky madtom. The area designated for critical habitat for the Chucky madtom includes only the stream channel within the ordinary high water line and does not contain any developed areas or structures.

#### Laurel Dace

We are designating critical habitat in areas within the geographical area occupied by the laurel dace at the time of listing in 2011. We are not designating any areas outside the geographical area occupied by the laurel dace because occupied areas are sufficient for the conservation of the species.

We used information from surveys and reports prepared by the Tennessee Valley Authority, Tennessee Wildlife Resources Agency, University of Tennessee, and the Service to identify the specific locations occupied by the laurel dace. Currently, occupied habitat for the species is limited and isolated. The species is currently located in three independent systems: Soddy Creek, the Sale Creek system, and the Piney River system. Following the identification of the specific locations occupied by the laurel dace, we determined the appropriate length of stream segments by identifying the upstream and downstream limits of these occupied sections necessary for the conservation of the laurel dace. Because populations of laurel dace are isolated due to dispersal barriers, to set the upstream and downstream limits of each critical habitat unit, we identified landmarks (bridges, confluences, and road crossings), and in some instances latitude and longitude coordinates and section lines above and below the upper and lowermost reported locations of the laurel dace, in each stream reach to ensure incorporation of all potential sites of occurrence. The designated critical habitat areas were then mapped using ARCGIS to produce the critical habitat unit maps.

We are designating as critical habitat all stream reaches in occupied habitat. We have defined occupied habitat as those stream reaches occupied at the time of listing and still known to be occupied by the laurel dace; these stream reaches comprise the entire known range of the laurel dace. Areas designated as critical habitat for the laurel dace include only stream channels within the ordinary high water line and do not contain any developed areas or structures.

We are designating as critical habitat six units that we determined were occupied at the time of listing and contain all of the identified elements of physical or biological

features to support life-history processes essential to the conservation of the laurel dace. Six units are designated based on sufficient elements of physical or biological features present to support laurel dace life-history processes. All units contain all of the identified elements of physical or biological features and support multiple life-history processes.

When determining critical habitat boundaries, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands usually lack physical and biological features for the listed species. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical and biological features in the adjacent critical habitat. The designation of critical habitat does not imply that lands outside of critical habitat do not play an important role in the conservation of the species.

The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document in the rule portion. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. We will make the coordinates or plot points or both on which each map is based available to the public on



<http://www.regulations.gov> at Docket No. FWS-R4-ES-2011-0074, on our Internet sites at <http://www.fws.gov/cookeville/>, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT** above).

We are designating as critical habitat lands that we have determined are occupied at the time of listing and contain sufficient physical or biological features to support life-history processes essential for the conservation of these five species, and lands outside of the geographical area occupied at the time of listing that we have determined are essential for the conservation of the Cumberland darter.

Units are designated based on sufficient elements of physical or biological features being present to support the Cumberland darter, rush darter, yellowcheck darter, Chucky madtom, and laurel dace life processes. Some units contain all of the identified elements of physical or biological features and support multiple life processes. Some units contain only some elements of the physical or biological features necessary to support the five species' particular use of that habitat.

### **Final Critical Habitat Designation**

#### **Cumberland Darter**

We are designating 15 units as critical habitat for the Cumberland darter. These units, which constitute our current best assessment of areas that meet the definition of critical habitat for the Cumberland darter, are: (1) Bunches Creek, (2) Calf Pen Fork, (3) Youngs Creek, (4) Barren Fork, (5) Indian Creek, (6) Cogur Fork, (7) Kilburn Fork, (8)

Laurel Fork, (9) Laurel Creek, (10) Elisha Branch, (11) Jenneys Branch, (12) Wolf Creek, (13) Jellico Creek, (14) Rock Creek, and (15) Capuchin Creek. Table 1 shows the occupancy of the units and ownership of the designated areas for the Cumberland darter.

TABLE 1. Occupancy and Ownership of the Designated Critical Habitat Units for the Cumberland Darter.

Unit	Location	Occupied	Private Ownership rkm (rmi)	Federal, State, County, City Ownership rkm (rmi)	Total Length rkm (rmi)
1	Bunches Creek	Yes	0	5.8 (3.6)	5.8 (3.6)
2	Calf Pen Fork	Yes	0	2.9 (1.8)	2.9 (1.8)
3	Youngs Creek	Yes	7.4 (4.6)	0	7.4 (4.6)
4	Barren Fork	Yes	0	6.3 (3.9)	6.3 (3.9)
5	Indian Creek	No	0	4.0 (2.5)	4.0 (2.5)
6	Cogur Fork	Yes	2.7 (1.7)	5.9 (3.7)	8.6 (5.4)
7	Kilburn Fork	No	0.9 (0.6)	3.7 (2.3)	4.6 (2.9)
8	Laurel Fork	Yes	1.3 (0.8)	2.2 (1.4)	3.5 (2.2)
9	Laurel Creek	Yes	0.6 (0.4)	8.8 (5.5)	9.4 (5.9)
10	Elisha Branch	Yes	0	2.1 (1.3)	2.1 (1.3)
11	Jenneys Branch	Yes	0	3.1 (1.9)	3.1 (1.9)
12	Wolf Creek	Yes	6.3 (3.9)	0	6.3 (3.9)
13	Jellico Creek	Yes	8.2 (5.1)	3.3 (2.1)	11.5 (7.2)
14	Rock Creek	Yes	3.9 (2.4)	2.2 (1.4)	6.1 (3.8)
15	Capuchin Creek	Yes	3.4 (2.1)	0.8 (0.5)	4.2 (2.6)
Total					85.8 (53.5)

We present brief descriptions of all units and reasons why they meet the definition of critical habitat for the Cumberland darter. The designated critical habitat units include the stream channels of the creek within the ordinary high water line. As defined in 33 CFR 329.11, the ordinary high water mark on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as

a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. Critical habitat units are either in private ownership or public ownership. In Kentucky and Tennessee, the owners of adjacent land also own the land under non-navigable streams (e.g., the stream channel or bottom), but the water is under State jurisdiction. Portions of the public-to-private boundary for units 6, 7, 8, 9, and 13 were located along the mid-line of the stream channel; lengths for these segments were divided equally between public and private ownership.

*Unit 1: Bunches Creek, Whitley County, Kentucky*

This unit is located between Kentucky Highway 90 (KY 90) and the Cumberland River and includes 5.8 rkm (3.6 rmi) of Bunches Creek from the confluence of Seminary Branch and Amos Falls Branch downstream to its confluence with the Cumberland River. Live Cumberland darters have been captured at two sites within Unit 1 (Thomas 2007, pp. 11–12), specifically at the mouth of Bunches Creek and just below its confluence with Calf Pen Fork. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. This unit is located entirely on Federal lands within the DBNF. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). The lower portion of Bunches Creek (stream rkm 0 to 0.3 (rmi 0 to 0.1)) flows through a designated Kentucky Wild River corridor (KRS 146.200 to 146.360) that extends along an approximately 25.7 km (16 mi) reach of the Cumberland River. This Wild River corridor extends from Summer Shoals downstream

to the backwaters of Lake Cumberland (KRS 146.241). The Bunches Creek-Cumberland River confluence is located approximately 3.0 km (1.9 mi) upstream of Cumberland Falls. The Bunches Creek watershed is relatively undisturbed, and access is limited (no road crossings). The channel within Unit 1 is relatively stable, with excellent instream habitat (PCE 1). There is an abundance of pool and run habitats (PCE 1), with relatively silt-free sand and bedrock substrates (PCE 2) and adequate instream flows (PCE 3). Water quality is good to excellent (PCE 4), as evidenced by diverse fish and macroinvertebrate communities (PCE 5).

Within Unit 1, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects associated with silviculture-related activities, natural gas and oil exploration activities in headwater reaches, illegal off-road vehicle use and other recreational activities, nonpoint source pollution originating in headwater reaches, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 2: Calf Pen Fork, Whitley County, Kentucky*

This unit includes 2.9 rkm (1.8 rmi) of Calf Pen Fork, a tributary of Bunches Creek, from its confluence with Polly Hollow downstream to its confluence with Bunches Creek. Live Cumberland darters have been captured in Calf Pen Fork just above its confluence with Bunches Creek (Thomas 2007, pp. 11–12). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. This unit is located entirely on Federal lands within the DBNF. Land and resource management decisions and

activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Similar to the watershed of Unit 1, the Calf Pen Fork watershed is relatively undisturbed, and access is limited (no road crossings). Within Unit 2, the channel is relatively stable, with excellent instream habitat (PCE 1), an abundance of run and pool habitats (PCE 1), relatively silt-free sand and bedrock substrates (PCE 2), and adequate instream flows (PCE 3). Water quality is good to excellent (PCE 4), with diverse fish and macroinvertebrate communities (PCE 5).

Within Unit 2, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects associated with silviculture-related activities, natural gas and oil exploration activities, illegal off-road vehicle use and other recreational activities, nonpoint source pollution arising from headwater reaches, and canopy loss caused by infestations of the hemlock woolly adelgid.

### *Unit 3: Youngs Creek, Whitley County, Kentucky*

Unit 3 includes 7.4 rkm (4.6 rmi) of Youngs Creek from Brays Chapel Road downstream to its confluence with the Cumberland River. Live Cumberland darters have been captured within Unit 3 (Thomas 2007, pp. 11–12), specifically at the KY 204 bridge crossing. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. This unit is located entirely on private land. The watershed of Youngs Creek is less forested than Units 1 and 2, with scattered residences and small farms. The channel is relatively stable (PCE 1), but activities associated with agriculture, silviculture, and residential

development have contributed to a more open riparian zone, increased bank erosion, and some siltation of instream habitats. Despite these impacts, Unit 3 continues to provide pool and run habitats with suitable sand and bedrock substrates for Cumberland darters to use in spawning, foraging, and other behaviors (PCEs 1 and 2). Flow is adequate as measured during years with average rainfall (PCE 3), water quality is adequate (PCE 4), and macroinvertebrate prey items are present (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), agricultural activities (livestock), lack of adequate riparian buffers, perched road culverts or impassable road crossings (fords), construction and maintenance of State and county roads, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 4: Barren Fork, McCreary County, Kentucky*

Unit 4 includes 6.3 rkm (3.9 rmi) of Barren Fork from its confluence with an unnamed tributary downstream to its confluence with Indian Creek. Based on survey results by Thomas (2007, pp. 11–12) and Stephens (2009, pp. 10–23), Barren Fork supports the most robust population of Cumberland darters within the species' range. Over the past 4 years, over 75 Cumberland darters have been observed within this unit (Thomas 2007, pp. 11–12; Stephens 2009, pp. 10–23). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of

essential physical or biological features. This unit is located entirely on Federal lands within the DBNF. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14). In the summer and fall of 2008, the Barren Fork watershed was adversely affected by several large sedimentation events originating from a county park construction site in the headwaters of the basin. Inadequate site planning and poor BMP implementation allowed significant quantities of sediment to leave the construction site and enter headwater tributaries of Barren Fork. The sediment was carried downstream into the mainstem of Barren Fork, eventually affecting the entire reach of Unit 4. Until the construction site was stabilized in 2009, important spawning and foraging habitats for the Cumberland darter were degraded.

Despite these significant adverse effects, habitat conditions have improved since 2008, and are now similar to those described for Units 1 and 2. The watershed is mostly forested, with relatively stable channels (PCE 1), abundant pool and run habitats (PCE 1), relatively silt-free sand and bedrock substrates (PCE 2), adequate flow (PCE 3), adequate water quality (PCE 4), and a diverse macroinvertebrate community (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), lack of adequate riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 5: Indian Creek, McCreary County, Kentucky*

Unit 5 includes 4.0 rkm (2.5 rmi) of Indian Creek from its confluence with Strunk Branch, downstream to its confluence with Barren Fork. Live Cumberland darters have not been captured within Unit 5. This unit was not included in the geographical area occupied by the species at the time of listing, and it is not currently occupied by the species.

This unit is located entirely on Federal lands within the DBNF. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

This unit is located within the historical range of the species, and is adjacent to currently occupied areas where there is potential for natural dispersal and reoccupation by the Cumberland darter. This unit is essential for the conservation of the Cumberland darter because it provides additional habitat for population expansion and will promote connectivity and genetic exchange between adjacent units to the south (Unit 4, Barren Fork) and to the north (Unit 6, Cogur Fork).

*Unit 6: Cogur Fork, McCreary County, Kentucky*

Unit 6 includes 8.6 rkm (5.4 rmi) of Cogur Fork from its confluence with an unnamed tributary downstream to its confluence with Indian Creek. Live Cumberland darters have been captured at several locations within an approximately 1-km (0.62-mi) reach upstream of the KY 1045 road crossing (Thomas 2010, pers. comm.). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. The majority of this unit (5.9 rkm (3.7 rmi)) is in public ownership (DBNF), with the remainder of the unit (2.7



rkm (1.7 rmi)) in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Cumberland darters have been captured within Unit 6, but the population is considered to be small (Thomas 2010, pers. comm.). From 2008 to present, the fauna has been bolstered through propagation and augmentation efforts by KDFWR, Conservation Fisheries, Inc. (CFI), and the Service (Thomas *et al.* 2010, p. 107). Initial brood stock were collected in 2008, with subsequent releases of propagated darters in 2009 (60 individuals (inds)) and 2010 (335 inds). Both tagged (propagated, 50 inds) and non-tagged (native, 4 inds) darters were observed during recent surveys in November 2010. Individuals tagged and released by KDFWR and CFI traveled distances ranging from 0.4 to 0.7 rkm (0.2 to 0.4 rmi) between their release date of September 22, 2010, and their recapture date of November 9, 2010 (period of 48 days) (Thomas 2010, pers. comm.).

Similar to other units located entirely or predominately on the DBNF (Units 1, 2, 4, and 5), this unit has relatively stable channels (PCE 1), abundant pool and run habitats (PCE 1), relatively silt-free sand and bedrock substrates (PCE 2), adequate flow (PCE 3), adequate water quality (PCE 4), and a diverse macroinvertebrate community (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), lack of adequate riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 7: Kilburn Fork, McCreary County, Kentucky*

Unit 7 includes 4.6 rkm (2.9 rmi) of Kilburn Fork from its confluence with an unnamed tributary downstream to its confluence with Laurel Fork. Live Cumberland darters have not been captured within Unit 7 over the last 15 years (Thomas 2007, pp. 11–12). This unit was not included in the geographical area occupied by the species at the time of listing, and it is not currently occupied by the species.

The majority of this unit (3.7 rkm (2.3 rmi)) is in public ownership (DBNF), with the remainder of the unit (0.9 rkm (0.6 rmi)) in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

This unit is located within the historical range of the species, and is adjacent to currently occupied areas where there is potential for natural dispersal and reoccupation by the Cumberland darter. This unit is essential for the conservation of the Cumberland darter because it provides additional habitat for population expansion and will promote connectivity and genetic exchange between adjacent units to the south (Unit 6, Cogur Fork) and to the north (Unit 8, Laurel Fork).

*Unit 8: Laurel Fork, McCreary County, Kentucky*

Unit 8 includes 3.5 rkm (2.2 rmi) of Laurel Fork from its confluence with Tom Fork downstream to its confluence with Indian Creek. Live Cumberland darters have been captured within Unit 8 (Thomas 2007, pp. 11–12), specifically just upstream of its confluence with Kilburn Fork. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or

biological features.

The majority of this unit (2.2 rkm (1.4 rmi)) is in public ownership (DBNF), with the remainder of the unit (1.3 rkm (0.8 rmi)) in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Similar to other streams with major portions of their basins in the DBNF, the watershed of Laurel Fork is relatively intact, and access is limited (limited roads and residential development). The channel within Unit 8 is relatively stable (PCE 1), with suitable instream habitat to support the life-history functions of the Cumberland darter. There is an abundance of pool and run habitats (PCE 1), with relatively silt-free sand and bedrock substrates (PCE 2) and adequate flows (PCE 3). Water quality is good to excellent (PCE 4), as evidenced by diverse fish and macroinvertebrate communities (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), lack of adequate riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 9: Laurel Creek, McCreary County, Kentucky*

Unit 9 includes 9.4 rkm (5.9 rmi) of Laurel Fork Creek from Laurel Fork Reservoir downstream to its confluence with Jenneys Branch. Live Cumberland darters

have been captured within Unit 9 (Thomas 2007, pp. 11–12), specifically just upstream of its confluence with Elisha Branch and at the KY 478 bridge crossing. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. The majority of this unit (8.8 rkm (5.5 rmi)) is in public ownership (DBNF), with the remainder of the unit (0.6 rkm (0.4 rmi)) in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed of Laurel Creek is relatively intact, with extensive forest cover and few roads. The channel within Unit 9 is relatively stable (PCE 1), with suitable instream habitat to support the life-history functions of the Cumberland darter. There is an abundance of pool and run habitats (PCE 1), with relatively silt-free sand and bedrock substrates (PCE 2) and adequate instream flows (PCE 3). Water quality is good to excellent (PCE 4), with a diverse macroinvertebrate community (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), lack of adequate riparian buffers, construction and maintenance of county roads, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 10: Elisha Branch, McCreary County, Kentucky*

Unit 10 includes 2.1 rkm (1.3 rmi) of Elisha Branch from its confluence with an unnamed tributary (36.70132, -84.40843) downstream to its confluence with Laurel

Creek. Live Cumberland darters have been captured within Unit 10 (Thomas 2007, pp. 11–12), specifically just upstream of its confluence with Laurel Creek. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. This unit is located entirely on public lands within the DBNF. Land and resource management decisions and activities within the DBNF are guided by DBNF’s LRMP (USFS 2004, pp. 1–14).

The watershed of Elisha Branch is relatively intact, with extensive forest cover and no road crossings. Within Unit 10, the channel is relatively stable, with excellent instream habitat (PCE 1), an abundance of run and pool habitats (PCE 1), relatively silt-free sand and bedrock substrates (PCE 2), and adequate flows (PCE 3). Water quality is good to excellent (PCE 4), with diverse fish and macroinvertebrate communities (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), lack of adequate riparian buffers, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 11: Jenneys Branch, McCreary County, Kentucky*

Unit 11 includes 3.1 rkm (1.9 rmi) of Jenneys Branch from its confluence with an unnamed tributary (36.73680, -84.42420) downstream to its confluence with Laurel Creek. Live Cumberland darters have been captured within Unit 11 (Thomas 2007, pp. 11–12), specifically just upstream of its confluence with Laurel Creek. This unit was

included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. This unit is located entirely on public lands within the DBNF. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

The watershed of Jenneys Branch is relatively intact and remote, with extensive forest cover and only one road crossing in its headwaters. Within Unit 11, the stream channel is relatively stable, with excellent instream habitat (PCE 1), an abundance of run and pool habitats (PCE 1), relatively silt-free sand and bedrock substrates (PCE 2), and adequate instream flows (PCE 3). Water quality is good to excellent (PCE 4), with diverse fish and macroinvertebrate communities (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), lack of adequate riparian buffers, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 12: Wolf Creek, Whitley County, Kentucky*

Unit 12 includes 6.3 rkm (3.9 rmi) of Wolf Creek from its confluence with Sheep Creek downstream to Wolf Creek River Road. Live Cumberland darters have been captured within Unit 12 just downstream of the Little Wolf Creek River Road bridge crossing (Thomas 2007, pp. 11–12). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical

or biological features.

This unit is located entirely on private land. Land use within the watershed of Wolf Creek is similar to Unit 3, and Unit 12 is less forested than units within the DBNF. The channel is relatively stable (PCE 1), but activities associated with agriculture, silviculture, and residential development have contributed to a more open riparian zone, increased bank erosion, and some siltation of instream habitats. Despite these impacts, Unit 12 continues to provide pool and run habitats with suitable sand and bedrock substrates for Cumberland darters to use in spawning, foraging, and other behaviors (PCEs 1 and 2). Flow is adequate as measured during years with average rainfall (PCE 3), water quality is adequate (PCE 4), and macroinvertebrate prey items are present (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), agricultural activities (livestock), lack of adequate riparian buffers, perched road culverts or impassable road crossings (fords), construction and maintenance of State and county roads, illegal off-road vehicle use, and nonpoint source pollution arising from a wide variety of human activities.

*Unit 13: Jellico Creek, McCreary County, Kentucky, and Scott County, Tennessee*

Unit 13 includes 11.5 rkm (7.2 rmi) of Jellico Creek from its confluence with Scott Branch, Scott County, Tennessee, downstream to its confluence with Capuchin Creek, McCreary County, Kentucky. Live Cumberland darters have been captured

within Unit 13 at the Jellico Creek and Shut-In Branch confluence and at the Gum Fork and Jellico Creek confluence (O'Bara 1988, p. 12; Thomas 2007, pp. 11–12). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. A portion of this unit in Kentucky (3.3 rkm (2.1 rmi)) is in public ownership (DBNF), with the remainder of the unit (8.2 rkm (5.1 rmi)) in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Land use within the watershed of Jellico Creek is predominately forest, with scattered residences and small farms (cattle and hay production). The channel in Unit 13 is relatively stable (PCE 1), but activities associated with agriculture, silviculture, and residential development have contributed to a more open riparian zone, increased bank erosion, and some siltation of instream habitats. Despite these impacts, Unit 13 continues to provide pool and run habitats with suitable sand and bedrock substrates for Cumberland darters to use in spawning, foraging, and other behaviors (PCEs 1 and 2). Flow is adequate as measured during years with average rainfall (PCE 3), water quality is adequate (PCE 4), and macroinvertebrate prey items are present (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), agricultural activities (livestock), lack of adequate riparian buffers, perched road culverts or impassable road crossings (fords), construction and maintenance of State and county roads, illegal off-road vehicle use, and nonpoint source pollution arising from a wide variety of human activities.



*Unit 14: Rock Creek, McCreary County, Kentucky*

Unit 14 includes 6.1 rkm (3.8 rmi) of Rock Creek from its confluence with Sid Anderson Branch downstream to its confluence with Jellico Creek. Live Cumberland darters have been captured within Unit 14 just above the mouth of Rock Creek at its confluence with Jellico Creek (Thomas 2007, pp. 11–12). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. A portion of this unit (2.2 rkm (1.4 rmi)) is in public ownership (DBNF), but the majority (3.9 rkm (2.4 rmi)) is in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Most of the watershed is forested (especially along the ridge tops), but the valley floor has several open fields and is easily accessible via Little Rock Creek Road. Portions of the channel in Unit 14 have been modified by beaver (with some ponding), but it continues to be relatively stable, with excellent instream habitat (PCE 1), an abundance of run and pool habitats (PCE 1), relatively silt-free sand and bedrock substrates (PCE 2), and adequate instream flows (PCE 3). Water quality is good to excellent (PCE 4), with diverse fish and macroinvertebrate communities (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), agricultural activities (livestock), lack of adequate riparian buffers, perched road culverts or impassable road crossings (fords), construction and maintenance of State and county

roads, illegal off-road vehicle use, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 15: Capuchin Creek, McCreary and Whitley Counties, Kentucky, and Campbell County, Tennessee*

Unit 15 includes 4.2 rkm (2.6 rmi) of Capuchin Creek from its confluence with Hatfield Creek downstream to its confluence with Jellico Creek. Live Cumberland darters have been captured within Unit 15 at the Kentucky-Tennessee State line (Thomas 2007, pp. 11–12). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. A portion of this unit in Kentucky (0.8 rkm (0.5 rmi)) is in public ownership (DBNF); the remainder in Kentucky and Tennessee (3.4 rkm (2.1 rmi)) is in private ownership. Land and resource management decisions and activities within the DBNF are guided by DBNF's LRMP (USFS 2004, pp. 1–14).

Land use within the watershed of Capuchin Creek is predominately forest, with scattered residences and small farms (cattle and hay production). The channel in Unit 15 is relatively stable (PCE 1), but activities associated with agriculture, silviculture, and residential development have contributed to a more open riparian zone, increased bank erosion, and some siltation of instream habitats. Despite these impacts, Unit 15 continues to provide pool and run habitats with suitable sand and bedrock substrates for Cumberland darters to use in spawning, foraging, and other behaviors (PCEs 1 and 2). Flow is adequate as measured during years with average rainfall (PCE 3), water quality is

adequate (PCE 4), and macroinvertebrate prey items are present (PCE 5).

Within this unit, the Cumberland darter and its habitat may require special management considerations or protection to address potential adverse effects caused by resource extraction (mining, silviculture, natural gas and oil exploration activities), agricultural activities (livestock), lack of adequate riparian buffers, perched road culverts or impassable road crossings (fords), construction and maintenance of State and county roads, illegal off-road vehicle use, and nonpoint source pollution arising from a wide variety of human activities.

#### Rush Darter

We are designating eight units as critical habitat for the rush darter. The below units, which constitute our current best assessment of areas that meet the definition of critical habitat for the rush darter, are: (1) Beaver Creek, (2) Unnamed Tributary to Beaver Creek and Highway 79 Spring Site, (3) Tapawingo or Penny Spring and Spring Run, (4) Wildcat Branch, (5) Mill Creek, (6) Doe Branch, (7) Little Cove Creek, Cove Spring Site, and (8) Bristow Creek. Table 2 shows the occupancy of the units and ownership of the designated areas for the rush darter.

TABLE 2. Occupancy and Ownership of the Designated Critical Habitat Units for the Rush Darter.

Unit	Location	Occupied	Private Ownership rkm (rmi)	State, County, City Ownership rkm (rmi)	Total Length rkm (rmi)	Total Area** ha (ac)
1	Beaver Creek	Yes	0.9 (0.6)	<0.1 (<0.1)	1.0 (0.6)	

2	Unnamed Tributary to Beaver Creek and Highway 79 Spring Site	Yes	3.7 (2.3)	0.7 (0.4)	4.4 (2.7)	0.1 (0.3)
3	Tapawingo or Penny Spring and Spring Run	Yes	0.6 (0.4)	<0.1 (<0.06)	0.6 (0.4)	6.7 (16.5)
4	Wildcat Branch	Yes	6.6 (4.1)	<0.1 (<0.06)	6.6 (4.1)	
5	Mill Creek	Yes	5.9 (3.7)	<0.1 (<0.06)	5.9 (3.7)	
6	Doe Branch	Yes	4.3 (2.7)	<0.1 (<0.06)	4.3 (2.7)	
7	Little Cove Creek, Cove Spring, Spring Run	Yes	11.2 (6.1)	<0.1 (<0.06)	11.2 (6.1)	5.1 (12.7)
8	Bristow Creek	Yes	10.2 (6.3)	<0.1 (<0.06)	10.2 (6.3)	
Total*					44.2 (26.6)	11.9 (29.5)

\* Totals may not sum due to rounding

\*\* Total area in ha (ac) are in private ownership

We present brief descriptions of each unit and reasons why they meet the definition of critical habitat below. The designated critical habitat units include the stream channels of the creek within the ordinary high water line, and the flooded spring pool in the case of Tapawingo or Penny Springs (Jefferson County), Unnamed Tributary to Beaver Creek (Jefferson County), and Cove Springs (Etowah County). As defined in 33 CFR 329.11, the ordinary high water line on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural water line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. In Alabama, the riparian landowner owns the stream to the middle of the channel for non-navigable streams and rivers. For the spring pools, the area was determined and delineated by the presence of emergent vegetation patterns as noted on aerial photographs.

*Unit 1: Beaver Creek, Jefferson County, Alabama*

Unit 1 includes 1.0 rkm (0.6 rmi) of Beaver Creek from the confluence with Dry Creek, downstream to the confluence with Turkey Creek. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 0.9 rkm (0.6 rmi), or 94 percent of this area is privately owned. The remaining 0.1 rkm (< 0.1 rmi), or 6 percent, is publicly owned by the City of Pinson or Jefferson County in the form of bridge crossings and road easements.

Beaver Creek contains adequate bottom substrate and emergent vegetation for rush darters to use in spawning, foraging, and other life processes (PCE 2). Beaver Creek makes available additional habitat and spawning sites, and offers connectivity with other rush darter populations within the Highway 79 Spring System site and the Unnamed Tributary to Beaver Creek (PCE 1).

Beaver Creek provides habitat for the rush darters with adequate number of pools, riffles, runs (PCE 1), and emergent vegetation (PCE 2). These geomorphic structures provide the species with spawning, foraging, and resting areas (PCE 1), along with good water quality, quantity, and flow, which support the normal life stages and behavior of the rush darter (PCEs 3 and 4), the species' prey sources (PCE 5), and associated aquatic vegetation.

Threats to the rush darter and its habitat at Beaver Creek that may require special management of the PBFs include the potential of: Urbanization activities (such as channel modification for flood control, construction of impoundments, and gravel extraction) that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management, water diversion, or water

withdrawal; significant alteration of water quality; and significant changes in stream bed material composition and quality as a result of construction projects and maintenance activities, destruction of emergent vegetation, off-road vehicle use, sewer, gas and water easements, bridge and road construction and maintenance, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

There are three road crossings over Beaver Creek (Pinson Valley Parkway, Old Bradford Road, and Spring Street) that at times may limit the overall connectivity and movement of the species within this unit. Movement might be limited due to changes in flow regime and habitat, including emergent vegetation, water quality, water quantity, and stochastic events such as drought. Populations of rush darters are small and isolated within specific habitat sites of Beaver Creek.

*Unit 2: Unnamed Tributary to Beaver Creek and Highway 79 Spring Site, Jefferson County, Alabama*

Unit 2 includes 4.4 rkm (2.7 rmi) of the Unnamed Tributary of Beaver Creek and two spring runs. The site begins at the Section 1 and 2 (T16S, R2W) line, as taken from the U.S. Geological Survey 7.5 topographical map (Pinson quadrangle), downstream to its confluence with Dry Creek, and includes a spring run beginning at the springhead (33.67449, -86.69300) just northwest of Old Pinson Road and intersecting with the Unnamed Tributary to Beaver Creek on the west side of Highway 79, and a spring associated wetland (0.1 ha, 0.33 ac) within the headwaters, south of Pinson Heights Road, flowing 0.9 km (0.05 mi) from the northwest (33.668173, -86.708577) and adjoining to

the Unnamed Tributary (33.667344,-86.707429). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features.

Almost 3.7 rkm (2.3 rmi), or 85 percent, of this area is privately owned. The remaining 0.7 rkm (0.4 rmi), or 15 percent, is publicly owned by the City of Pinson or Jefferson County in the form of bridge crossings and road easements.

The Unnamed Tributary to Beaver Creek supports populations of rush darters and is a feeder stream to Beaver Creek (PCEs 1 and 2). The Unnamed Tributary to Beaver Creek has been intensely geomorphically changed by man over the last 100 years. The majority of this reach has been channelized for flood control, as it runs parallel to Highway 79. There are several bridge crossings and culverts that interfere with connectivity, and the reach has a history of industrial uses along the bank. However, owing to the groundwater that constantly supplies this reach with clean and flowing water (PCEs 3 and 4), the reach has been able to support significant emergent vegetation in shallow water on the margins to support several rush darter populations. The headwaters of the Unnamed Tributary to Beaver Creek is characterized by natural flows that are attributed to an abundance of spring groundwater discharges contributing adequate water quality, water quantity, emergent vegetation and appropriate substrates (PCEs 1, 2, 3, and 4). The 0.13 ha (0.33 ac) spring run and associated wetlands is characterized by adequate spring water flow and associated vegetation (PCEs 1 and 2). Increasing the connectivity of the rush darter populations (PCE 1) throughout the reaches of this tributary is an essential conservation requirement as it would decrease the vulnerability of these populations to stochastic threats. The Highway 79 Spring Site is the type locality for the

species (Bart 2004, p. 194), supporting populations of rush darters and providing supplemental water quantity to the Unnamed Tributary to Beaver Creek (PCEs 1 and 3). The reach contains adequate bottom substrate and emergent vegetation for rush darters to use in spawning, foraging, and other life processes (PCE 2). The Highway 79 Spring site provides habitat and spawning sites, and offers connectivity with rush darter populations in the Unnamed Tributary to Beaver Creek (PCE 1).

Threats to the rush darter and its habitat that may require special management and protection of PBFs are: Urbanization activities (such as channel modification for flood control, and gravel extraction) that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management and impoundment construction, water diversion, or water withdrawal; significant alteration of water quality; and significant changes in stream bed material composition and quality as a result of construction projects and road maintenance activities, off-road vehicle use, sewer, gas and water easements, bridge construction, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

### *Unit 3: Tapawingo or Penny Spring and Spring Run, Jefferson County, Alabama*

Unit 3 includes 0.6 rkm (0.4 rmi) of spring run, historically called Tapawingo Plunge, along with 6.7 ha (16.5 ac) of flooded spring basin making up Penny Springs. Unit 3 is located south of Turkey Creek, north of Bud Holmes Road, and just east of Tapawingo Trail Road. The east boundary is at (33.69903, -86.66528): 1.0 km (0.6 mi) west of Section Line 28 to 29 (T15S, R1W) (U.S. Geological Survey 7.5 topographical



map (Pinson quadrangle)). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. All 0.6 rkm (0.4 rmi) and 6.7 ha (16.5 ac) of Unit 3 is privately owned except for that small amount that is publicly owned in the form of bridge crossings and road easements.

The Tapawingo or Penny Spring complex consists of an abundance of springs that drain directly into Turkey Creek by means of a large spring run at the old railroad crossing and Tapawingo Springs Road (PCEs 1 and 2). The historical spring run discharge ranges from 0.03 to 2.4 cubic meters per second ( $\text{m}^3/\text{s}$ ) (500 to 38,800 gallons per minute ( $\text{gal}/\text{min}$ )) (Chandler and Moore 1987, p. 49), and there is an abundance of emergent vegetation (PCEs 1, 2, and 3). Historically small numbers of rush darter have been collected in the spring area.

Threats to the rush darter and its habitat that may require special management and protection of physical and biological features are: Urbanization activities (such as channel modification for flood control, vegetation management, and gravel extraction) that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management and impoundment construction, water diversion, or water withdrawal; significant alteration of water quality; introduced species; significant alteration or destruction of aquatic and emergent vegetation; and significant changes in stream bed material composition and quality as a result of construction projects and maintenance activities, off-road vehicle use, sewer, gas and water easements, bridge construction, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

#### *Unit 4: Wildcat Branch, Winston County, Alabama*

Unit 4 includes 6.6 rkm (4.1 rmi) of Wildcat Branch from the streams headwaters just east of Winston County Road 29 to the confluence with Clear Creek. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 6.6 rkm (4.1 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Winston County in the form of bridge crossings and road easements.

Wildcat Branch provides habitat for rush darters with a network of small pools and spring runs, along with an abundance of emergent vegetation (PCE 1 and 2). These geomorphic structures provide the species with spawning, foraging, and resting areas (PCE 1), along with good water quality, quantity, and flow (PCEs 3 and 4), which support the normal life stages and behavior of the rush darter and the species' prey sources (PCE 5). Rush darters are consistently collected in Wildcat Branch, but not in large numbers.

Threats that may require special management and protection of physical and biological features include: Poor silviculture and agriculture practices; road and roadside maintenance; local residential development and urbanization activities (such as channel modification for flood control and gravel extraction) that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management and impoundment construction, water diversion, or water withdrawal; significant alteration of water quality; significant alteration or destruction of aquatic and emergent vegetation; and significant changes in stream bed material composition and

quality as a result of construction projects and maintenance activities, off-road vehicle use, sewer, gas and water easements, bridge construction, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

*Unit 5: Mill Creek, Winston County, Alabama*

Unit 5 includes 5.9 rkm (3.7 rmi) of Mill Creek from the stream headwaters just east of Winston County Road 195 to the confluence with Clear Creek. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 5.9 rkm (3.7 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Winston County in the form of bridge crossings and road easements.

Mill Creek provides habitat for the rush darter with a network of small pools, and spring runs, along with an abundance of emergent vegetation (PCE 1 and 2). These geomorphic structures provide the species with spawning, foraging, and resting areas (PCE 1), along with good water quality, quantity, and flow (PCEs 3 and 4), which support the normal life stages and behavior of the rush darter and the species' prey sources (PCE 5). Rush darters are consistently collected in Mill Creek.

Threats that may require special management and protection of PBFs include: Poor silviculture and agriculture practices; road and roadside maintenance; local residential development and urbanization activities (such as channel modification for flood control and gravel extraction) that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater

management and impoundment construction, water diversion, or water withdrawal; significant alteration of water quality; significant alteration or destruction of aquatic and emergent vegetation; and significant changes in stream bed material composition and quality as a result of construction projects and maintenance activities, off-road vehicle use, sewer, gas and water easements, bridge construction, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

*Unit 6: Doe Branch, Winston County, Alabama*

Unit 6 includes 4.3 rkm (2.7 rmi) of Doe Branch from the stream headwaters north and west of Section Line 23 and 14 (R9W, T11S; Popular Springs Quadrangle) to the confluence with Wildcat Branch. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 4.3 rkm (2.7 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Winston County in the form of bridge crossings and road easements.

Doe Branch provides habitat for the rush darter with a small network of small pools, and spring runs, along with adequate emergent vegetation (PCE 1 and 2). These geomorphic structures provide the species with spawning, foraging, and resting areas (PCE 1), along with good water quality, quantity, and flow (PCEs 3 and 4), which support the normal life stages and behavior of the rush darter and the species' prey sources (PCE 5). Although the species is considered rare in Doe Branch, there have been few collection attempts in the stream with a few darters captured (Mettee *et al.* 1989, p.

61). Doe Branch contains habitat for the species and is considered occupied. The stream joins Wildcat Branch before flowing into Clear Creek.

Threats that may require special management and protection of physical and biological features include: Poor silviculture and agriculture practices; road and roadside maintenance; local residential development and urbanization activities (such as channel modification for flood control and gravel extraction) that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management and impoundment construction, water diversion, or water withdrawal; significant alteration of water quality; significant alteration or destruction of aquatic and emergent vegetation; and significant changes in stream bed material composition and quality as a result of construction projects and maintenance activities, off-road vehicle use, sewer, gas and water easements, bridge construction, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

*Unit 7: Little Cove Creek, Cove Spring and Spring Run, Etowah County, Alabama*

Unit 7 includes 11.2 rkm (6.1 rmi) of Little Cove Creek and the Cove Spring run system along with 5.1 ha (12.7 ac) of the spring run floodplain. Specifically, the Little Cove Creek section (11.0 rkm (6.0 rmi)) is from the intersection of Etowah County Road 179 near the creek headwaters, downstream to its confluence with the Locust Fork River. The Cove Spring and spring run section includes 0.2 rkm (0.1 rmi) of the spring run from the springhead at the West Etowah Water and Fire Authority pumping station on Cove Spring Road to the confluence with Little Cove Creek and includes 5.1 ha (12.7 ac) of

the spring run floodplain due south of the pumping facility. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. All 11.2 rkm (6.1 rmi) of Unit 7 is privately owned except for that small amount that is publicly owned by Etowah County in the form of bridge crossings and road easements.

Little Cove Creek provides habitat for the rush darter with a network of small pools, and spring runs, along with an abundance of emergent aquatic vegetation (PCE 1 and 2). These geomorphic structures provide the species with spawning, foraging, and resting areas (PCE 1), along with good water quality, quantity, and flow (PCEs 3 and 4), which support the normal life stages and behavior of the rush darter and the species' prey sources (PCE 5). Rush darters are collected in Little Cove Creek, but not in large numbers. The Cove Spring and Spring Run site supports small populations of rush darters and provides supplemental water quantity to Little Cove Creek (PCEs 1 and 3). Water quantity from the spring averages 0.2 m<sup>3</sup>/s (3,000 gal/min) (Snead 2011, pers. comm.) (PCE 4). The spring contains an abundance of gravel and silt along with significant emergent vegetation for rush darters to use in spawning, foraging, and other life processes (PCE 2). The Cove Spring and Spring Run site provides habitat and spawning sites, and offers connectivity with rush darter populations to Little Cove Creek (PCE 1).

Threats that may require special management and protection of physical and biological features include: Road and roadside maintenance; agricultural and silviculture activities that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management; impoundment construction,

water diversion, or water withdrawal for livestock and irrigation; significant alteration or destruction of aquatic and emergent vegetation; significant alteration of water quality due to release of chlorinated water and other chemicals into the Cove Spring run or Little Cove Creek by the water pumping facility or other sources; and off-road vehicle use, sewer, gas and water easements, bridge construction, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

*Unit 8: Bristow Creek, Etowah County, Alabama*

Unit 8 includes 10.2 rkm (6.3 rmi) of Bristow Creek beginning from its intersection with Fairview Cove Road, downstream to the confluence with the Locust Fork River. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. All 10.2 rkm (6.3 rmi) of Bristow Creek, beginning at the bridge at Fairview Road, downstream to the confluence with the Locust Fork River is privately owned except for that small amount that is publicly owned by Etowah County in the form of bridge crossings and road easements.

Bristow Creek, although channelized in some locations, provides habitat and connectivity for the rush darters (PCE 1). Locations within the creek have the necessary stream attributes of some small pools, and spring runs (PCE 1) along with emergent vegetation (PCE 2). These geomorphic structures provide the species with spawning, foraging, and resting areas (PCE 1), along with supplemental water quantity and flow (PCE 3), which support the normal life stages and behavior of the rush darter and the

species' prey sources (PCE 5). The rush darter is considered rare in Bristow Creek, but sampling has been limited.

Threats that may require special management and protection of physical and biological features include: Road and roadside maintenance; agricultural and silviculture activities that could result in increased bank erosion; significant changes in the existing flow regime due to inadequate stormwater management; significant alteration or destruction of aquatic and emergent vegetation; impoundment construction, water diversion, or water withdrawal for livestock and irrigation; and off-road vehicle use, sewer, gas and water easements, septic tank drain fields, bridge construction and maintenance, culvert and pipe installation, and other watershed and floodplain disturbances that release sediments or nutrients into the water.

#### Yellowcheek Darter

We are designating four units as critical habitat for the yellowcheek darter. These units, all of which are on the Little Red River, constitute our current best assessment of areas that meet the definition of critical habitat for the yellowcheek darter and are as follows: (1) Middle Fork, (2) South Fork, (3) Archey Fork, and (4) Devil's Fork (includes Turkey Creek and Beech Fork). Table 3 shows the occupancy of the units and ownership of the designated areas for the yellowcheek darter.

TABLE 3. Occupancy and Ownership of the Designated Critical Habitat Units for the Yellowcheek Darter.



Unit	Location	Occupied	Private Ownership rkm (rmi)	State, County, City Ownership rkm (rmi)	Total Length rkm (rmi)
1	Middle Fork Little Red River	Yes	73.2 (45.5)	0	73.2 (45.5)
2	South Fork Little Red River	Yes	33.3 (20.7)	0.5 (0.3)	33.8 (21.0)
3	Archey Fork Little Red River	Yes	28.2 (17.5)	0.3 (0.2)	28.5 (17.7)
4	Devil's Fork Little Red River	Yes	28.0 (17.4)	0	28.0 (17.4)
Total			162.7 (101.1)	0.8 (0.5)	163.5 (101.6)

We present brief descriptions of all units and reasons why they meet the definition of critical habitat for the yellowcheek darter. The designated critical habitat units include the river channels within the ordinary high water line. As defined in 33 CFR 329.11, the ordinary high water mark on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. In Arkansas, the state owns the stream channel within the ordinary high water lines for navigable streams and rivers, including all streams within the critical habitat designation for yellowcheek darter. For each stream reach designated as a critical habitat unit, the upstream and downstream boundaries are described generally below.

*Unit 1: Middle Fork of the Little Red River, Searcy, Stone, and Van Buren Counties, Arkansas*

Unit 1 includes 73.2 rkm (45.5 rmi) of the Middle Fork of the Little Red River from Searcy County Road 167 approximately 3.4 km (2.1 mi) southwest of Leslie, Arkansas, to a point on the stream 7.7 rkm (4.8 rmi) downstream (35.66515, -92.25942) of the Arkansas Highway 9 crossing of the Middle Fork near Shirley, Arkansas. The lower boundary coincides with the 140.5-m (461-ft) elevation of the conservation pool for Greers Ferry Lake where suitable habitat becomes inundated by Greers Ferry Lake and no longer supports the yellowcheek darter. Live yellowcheek darters have been collected from four sites within Unit 1. The uppermost site is immediately below the Hwy 65 Bridge near Leslie, Arkansas, and the lowermost site is immediately below the Hwy 9 Bridge in Shirley, Arkansas (Wine and Blumenshine 2002, p. 18). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Approximately 100 percent of Unit 1 is privately owned. County and State road crossings exist in all three counties and account for less than one percent of total Unit 1 ownership.

This unit contains stable riffle areas of moderate to swift velocity (PCE 1) that are relatively silt-free (PCE 2) and maintain surface flows year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of yellowcheek darters. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for yellowcheek darters (PCE 5).

Threats that may require special management and protection of physical and biological features include: Changes in the existing stream ecology due to activities

associated with natural gas development, livestock grazing, county road maintenance, timber harvest, water diversion, gravel mining, and rock harvesting operations.

Alteration of water quality and changes in streambed material composition from any other activities that would release sediments, nutrients, or toxins into the water also act as threats to the yellowcheek darter.

*Unit 2: South Fork of the Little Red River, Van Buren County, Arkansas*

Unit 2 includes 33.8 rkm (21.0 rmi) of the South Fork of the Little Red River from Van Buren County Road 9 three miles north of Scotland, Arkansas, to a point on the stream (35.57364, -92.42718) approximately 5.5 rkm (3.4 rmi) downstream of U.S. Highway 65 in Clinton, Arkansas, where suitable habitat becomes inundated by Greers Ferry Lake and no longer supports the yellowcheek darter. Live yellowcheek darters have been collected from four sites along the South Fork Little Red River, including the uppermost boundary at the County Road 9 Bridge and just above the Hwy 65 Bridge in Clinton, Arkansas. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Approximately 33.3 rkm (20.7 rmi), or >99 percent, of Unit 2 is privately owned, and 0.5 rkm (0.3 rmi) is within the boundary of property owned by the city of Clinton, Arkansas. County and State road crossings account for less than one percent of total Unit 2 ownership.

This unit contains stable riffle areas of moderate to swift velocity (PCE 1) that are relatively silt-free (PCE 2) and maintain surface flows year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of yellowcheek

darters. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for yellowcheek darters (PCE 5).

Threats that may require special management and protection of physical and biological features include: Changes in the existing stream ecology due to activities associated with natural gas development, livestock grazing, county road maintenance, timber harvest, water diversion, and gravel mining. Alteration of water quality and changes in streambed material composition from any other activities that would release sediments, nutrients, or toxins into the water also act as threats to the yellowcheek darter.

### *Unit 3: Archey Fork of the Little Red River, Van Buren County, Arkansas*

Unit 3 includes 28.5 rkm (17.7 rmi) of the Archey Fork of the Little Red River from its junction with South Castleberry Creek to its confluence with the South Fork of the Little Red River near Clinton, Arkansas. Live yellowcheek darters have been collected just above the confluence of the Archey and South Forks (Wine *et al.* 2000, p. 10) and at a point 15.3 rkm (9.5 rmi) above the confluence (Brophy and Stoeckel 2006, p. 3). This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Unit 3 is nearly 100 percent privately owned with the exception of a small city park in Clinton, Arkansas. County and State road crossings and portions within the city of Clinton, Arkansas, account for less than one percent of total Unit 3 ownership.

This unit contains stable riffle areas of moderate to swift velocity (PCE 1) that are relatively silt-free (PCE 2) and maintain surface flows year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of yellowcheek darters. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for yellowcheek darters (PCE 5).

Threats that may require special management and protection of physical and biological features include: Changes in the existing stream ecology due to activities associated with natural gas development, livestock grazing, county road maintenance, timber harvest, water diversion, and gravel mining. Alteration of water quality and changes in streambed material composition from any other activities that would release sediments, nutrients, or toxins into the water also act as threats to the yellowcheek darter.

*Unit 4: Devil's Fork of the Little Red River (including Turkey Creek and Beech Fork), Stone and Cleburne Counties, Arkansas*

Unit 4 includes 28.0 rkm (17.4 rmi) of stream from Stone County Road 21 approximately 3 miles north of Prim, Arkansas, to a point (35.63556, -92.03400) on the Devil's Fork approximately 5.1 km (3.2 mi) southeast of Woodrow, Arkansas, where suitable habitat becomes inundated by Greers Ferry Lake and no longer supports the yellowcheek darter. Live yellowcheek darters have not been collected at the uppermost site (Turkey Creek) since 1999 (Mitchell *et al.* 2002, p. 131). However, Wine and Blumenshine (2002, p. 11) did detect yellowcheek darters in the Beech Fork, and it is

likely that the species persists in very low numbers within the upper portions of the watershed during normal flow years. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Approximately 100 percent of Unit 4 is privately owned. County road crossings exist in both counties and account for less than one percent of total Unit 4 ownership.

This unit contains stable riffle areas of moderate to swift velocity (PCE 1) that are relatively silt-free (PCE 2) and maintain surface flows year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of yellowcheek darters. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for yellowcheek darters (PCE 5).

Threats that may require special management and protection of physical and biological features include: Changes in the existing stream ecology due to activities associated with natural gas development, livestock grazing, county road maintenance, timber harvest, water diversion, and gravel mining. Alteration of water quality and changes in streambed material composition from any other activities that would release sediments, nutrients, or toxins into the water also act as threats to the yellowcheek darter.

#### Chucky Madtom

We are designating one unit as critical habitat for the Chucky madtom. The unit, which constitutes our current best assessment of the area that meets the definition of

critical habitat for the Chucky madtom, is Little Chucky Creek, which was occupied at the time of listing. Table 4 shows the occupancy of the unit and ownership of the designated unit for the Chucky madtom.

TABLE 4. Occupancy and Ownership of the Designated Critical Habitat Unit for the Chucky Madtom.

Unit	Location	Occupied	Private Ownership rkm (rmi)	State, County, City Ownership rkm (rmi)	Total Length rkm (rmi)
	Little Chucky Creek	Yes	31.8 (19.7)	<0.1 (<0.06)	31.9 (19.8)
Total					31.9 (19.8)

We present a brief description of the unit and reasons why it meets the definition of critical habitat for the Chucky madtom. The critical habitat unit includes the river channel within the ordinary high water line. As defined in 33 CFR 329.11, the ordinary high water mark on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. Lands in the critical habitat unit are either in private ownership or public ownership (Greene County road easements). In Tennessee, landowners own the land under non-navigable streams (e.g., the stream channel or bottom), but the water is under State jurisdiction.

*Unit 1: Little Chucky Creek, Greene County, Tennessee*

This unit includes 31.9 rkm (19.8 rmi) of Little Chucky Creek from its confluence with an unnamed tributary, downstream to its confluence with the Nolichucky River, at the Greene and Cocke County line, Tennessee. Although the Chucky madtom has not been observed since 2004, we still consider it to exist in Little Chucky Creek.

Observations of the species have always been sporadic, and it is a cryptic species that is hard to locate. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features.

Almost 31.9 rkm (19.8 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Greene County in the form of bridge crossings and road easements.

This unit contains stable riffle and run areas of moderate to swift velocity (PCE 1); flat gravel, cobble, and slab-rock boulders that are relatively silt-free (PCE 2); and surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of Chucky madtoms. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for the Chucky madtom (PCE 5).

This critical habitat unit is almost entirely located on private property and is not presently under the special management or protection provided by a legally operative plan or agreement for the conservation of the species. Various activities in or adjacent to the critical habitat unit described in this rule may affect one or more of the PBFs.



Features in this critical habitat designation that may require special management are due to threats posed by agricultural activities (e.g., row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, gravel mining, and nonpoint source pollution arising from a wide variety of human activities.

#### Laurel Dace

We are designating six units as critical habitat for the laurel dace. The units, which constitute our current best assessment of areas that meet the definition of critical habitat for the laurel dace, are: (1) Bumbee Creek, (2) Youngs Creek, (3) Moccasin Creek, (4) Cupp Creek, (5) Horn Branch, and (6) Soddy Creek. Table 5 shows the occupancy of the units and ownership of the designated areas for the laurel dace.

TABLE 5. Occupancy and Ownership of the Designated Critical Habitat Units for the Laurel Dace.

Unit	Location	Occupied	Private Ownership rkm (rmi)	State, County, City Ownership rkm (rmi)	Total Length rkm (rmi)
1	Bumbee Creek	Yes	7.7 (4.7)	<0.1 (<0.06)	7.8 (4.8)
2	Youngs Creek	Yes	7.8 (4.8)	<0.1 (<0.06)	7.9 (4.9)
3	Moccasin Creek	Yes	8.9 (5.5)	<0.1 (<0.06)	9.0 (5.6)
4	Cupp Creek	Yes	4.9 (3.0)	<0.1 (<0.06)	5.0 (3.1)
5	Horn Branch	Yes	3.9 (2.4)	<0.1 (<0.06)	4.0 (2.5)
6	Soddy Creek	Yes	8.3 (5.1)	<0.1 (<0.06)	8.4 (5.2)
Total					42.2 (26.2)

We present brief descriptions of all units and reasons why they meet the definition of critical habitat for the laurel dace. The designated critical habitat units include the river channels within the ordinary high water line. As defined in 33 CFR 329.11, the ordinary high water mark on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. Lands in critical habitat units are either in private ownership or public ownership (county road easements). In Tennessee,

landowners own the land under non-navigable streams (e.g., the stream channel or bottom), but the water is under State jurisdiction.

*Unit 1: Bumbee Creek, Bledsoe and Rhea Counties, Tennessee*

Unit 1 includes 7.8 rkm (4.8 rmi) of Bumbee Creek from its headwaters in Bledsoe County, downstream to its confluence with Mapleslush Branch in Rhea County, Tennessee. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 7.7 rkm (4.7 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Bledsoe and Rhea Counties in the form of bridge crossings and road easements.

This unit contains stable headwater streams (PCE 1) that are relatively silt-free, contain cobble and slab-rock boulder substrates with canopy cover (PCE 2), and have surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of laurel dace. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for laurel dace (PCE 5).

Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. Features in this critical habitat designation that may require special management are due to threats posed by resource extraction

(coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 2: Youngs Creek, Bledsoe and Rhea Counties, Tennessee*

Unit 2 includes 7.9 rkm (4.9 rmi) of Youngs Creek from its headwaters in Bledsoe County, downstream to its confluence with Moccasin Creek in Rhea County, Tennessee. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 7.8 rkm (4.8 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Bledsoe and Rhea Counties in the form of bridge crossings and road easements.

This unit contains stable headwater streams (PCE 1) that are relatively silt-free, contain cobble and slab-rock boulder substrates with canopy cover (PCE 2), and have surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of laurel dace. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for laurel dace (PCE 5).

Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. Features in this critical habitat designation that may require special management are due to threats posed by resource extraction (coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 3: Moccasin Creek, Bledsoe County, Tennessee*

Unit 3 includes 9.0 rkm (5.6 rmi) of Moccasin Creek from its headwaters downstream to 0.1 rkm (0.6 rmi) below its confluence with Lick Creek in Bledsoe County, Tennessee. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 8.9 rkm (5.5 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Bledsoe County in the form of bridge crossings and road easements.

This unit contains stable headwater streams (PCE 1) that are relatively silt-free, contain cobble and slab-rock boulder substrates with canopy cover (PCE 2), and have surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of laurel dace. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support

abundant populations of aquatic macroinvertebrates that serve as prey items for laurel dace (PCE 5).

Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. Features in this critical habitat designation that may require special management are due to threats posed by resource extraction (coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

#### *Unit 4: Cupp Creek, Bledsoe County, Tennessee*

Unit 4 includes 5.0 rkm (3.1 rmi) of Cupp Creek from its headwaters downstream to its confluence with an unnamed tributary in Bledsoe County, Tennessee. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 4.9 rkm (3.0 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Bledsoe County in the form of bridge crossings and road easements.

This unit contains stable headwater streams (PCE 1) that are relatively silt-free; contain cobble and slab-rock boulder substrates with canopy cover (PCE 2), and have surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of laurel dace. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen

concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for laurel dace (PCE 5).

Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. Features in this critical habitat designation that may require special management are due to threats posed by resource extraction (coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 5: Horn Branch, Bledsoe County, Tennessee*

Unit 5 includes 4.0 rkm (2.5 rmi) of Horn Branch from its headwaters downstream to its confluence with Rock Creek in Bledsoe County, Tennessee. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 3.9 rkm (2.4 rmi), or 100 percent, of this area is privately owned except for that small amount that is publicly owned by Bledsoe County in the form of bridge crossings and road easements.

This unit contains stable headwater streams (PCE 1) that are relatively silt-free, contain cobble and slab-rock boulder substrates with canopy cover (PCE 2), and have surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of laurel dace. Water quality within this

unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for laurel dace (PCE 5).

Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. Features in this critical habitat designation that may require special management are due to threats posed by resource extraction (coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

*Unit 6: Soddy Creek, Sequatchie and Bledsoe Counties, Tennessee*

Unit 6 includes 8.4 rkm (5.2 rmi) of Soddy Creek from its headwaters in Sequatchie County, downstream to its confluence with Harvey Creek in Sequatchie County, Tennessee. This unit was included in the geographical area occupied by the species at the time of listing and contains elements of essential physical or biological features. Almost 8.3 rkm (5.1 rmi), or 100 percent, of this area is privately owned except for a small amount that is publicly owned by Sequatchie and Bledsoe Counties in the form of bridge crossings and road easements.

This unit contains stable headwater streams (PCE 1) that are relatively silt-free, contain cobble and slab-rock boulder substrates with canopy cover (PCE 2), and have



surface flows that are maintained year round (PCE 3). Such characteristics are necessary for reproductive and sheltering requirements of laurel dace. Water quality within this unit is also characterized by moderate temperatures, relatively high dissolved oxygen concentrations, moderate pH, and low levels of pollutants (PCE 4), which support abundant populations of aquatic macroinvertebrates that serve as prey items for laurel dace (PCE 5).

Various activities in or adjacent to these areas of critical habitat may affect one or more of the physical and biological features. Features in this critical habitat designation that may require special management are due to threats posed by resource extraction (coal and gravel mining, silviculture, natural gas and oil exploration activities), agricultural activities (row crops and livestock), lack of adequate riparian buffers, construction and maintenance of State and county roads, nonpoint source pollution arising from a wide variety of human activities, and canopy loss caused by infestations of the hemlock woolly adelgid.

## **Effects of Critical Habitat Designation**

### *Section 7 Consultation*

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species

proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

Decisions by the 5th and 9th Circuits Court of Appeals have invalidated our regulatory definition of “destruction or adverse modification” (50 CFR 402.02) (see *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, 378 F.3d 1059 (9<sup>th</sup> Cir. 2004) and *Sierra Club v. U.S. Fish and Wildlife Service et al.*, 245 F.3d 434, 442 (5<sup>th</sup> Cir. 2001)), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the statutory provisions of the Act, we determine destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not Federally funded or authorized do not require section 7 consultation.

As a result of section 7 consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

- (1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or
- (2) A biological opinion for Federal actions that may affect, or are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat, we provide reasonable and prudent alternatives to the project, if any are identifiable, that would avoid the likelihood of jeopardy or destruction or adverse modification of critical habitat. We define “reasonable and prudent alternatives” (at 50 CFR 402.02) as alternative actions identified during consultation that:

- (1) Can be implemented in a manner consistent with the intended purpose of the action,
- (2) Can be implemented consistent with the scope of the Federal agency’s legal authority and jurisdiction,
- (3) Are economically and technologically feasible, and
- (4) Would, in the Director’s opinion, avoid the likelihood of jeopardizing the continued existence of the listed species or avoid the likelihood of destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies sometimes may need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

#### *Application of the "Adverse Modification" Standard*

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for these species. Activities that may destroy or adversely modify critical habitat are those that alter the physical and biological features to an extent that appreciably reduces the conservation value of critical habitat for these species. As discussed above, the role of critical habitat is to support life-history needs of these species and provide for the conservation of these species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that may affect critical habitat, when carried out, funded, or authorized by a Federal agency, should result in consultation for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace. These activities include, but are not limited to:

(1) Actions that would alter the geomorphology of stream habitats. Such activities could include, but are not limited to, instream excavation or dredging, impoundment, channelization, road and bridge construction, mining, and discharge of fill materials. These activities could cause aggradation or degradation of the channel bed elevation or significant bank erosion, result in entrainment or burial of these fishes, and cause other direct or cumulative adverse effects to these species.

(2) Actions that would significantly alter the existing flow regime or water quantity. Such activities could include, but are not limited to, impoundment, water diversion, water withdrawal, and hydropower generation. These activities could eliminate or reduce the habitat necessary for growth and reproduction of these fishes.

(3) Actions that would significantly alter water quantity or water quality (for example, temperature, pH, contaminants, and excess nutrients). Such activities could

include, but are not limited to, hydropower discharges, or the release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater at a point source or by dispersed release (nonpoint source). These activities could alter water conditions that are beyond the tolerances of these fishes and result in direct or cumulative adverse effects to these species.

(4) Actions that would significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth. Such activities could include, but are not limited to, construction projects, livestock grazing, timber harvest, off-road vehicle use, and other watershed and floodplain disturbances that release sediments or nutrients into the water. These activities could eliminate or reduce habitats necessary for the growth and reproduction of these fishes by causing excessive sedimentation or eutrophication.

## **Exemptions**

### *Application of Section 4(a)(3) of the Act*

The Sikes Act Improvement Act of 1997 (Sikes Act) (16 U.S.C. 670a) required each military installation that includes land and water suitable for the conservation and management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

- (1) An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;
- (2) A statement of goals and priorities;
- (3) A detailed description of management actions to be implemented to provide for these ecological needs; and
- (4) A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108-136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) now provides: “The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.”

There were no Department of Defense lands with a completed INRMP within the proposed critical habitat designation. Therefore, we are not exempting lands from this

final designation of critical habitat for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, or laurel dace under section 4(a)(3)(B)(i) of the Act.

## **Exclusions**

### *Application of Section 4(b)(2) of the Act*

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the statute on its face, as well as the legislative history, is clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise his discretion to exclude the area only if such exclusion would not result in the extinction of the species.



## Exclusions Based on Economic Impacts

Under section 4(b)(2) of the Act, we consider the economic impacts of specifying any particular area as critical habitat. In order to consider economic impacts, we prepared a draft economic analysis of the proposed critical habitat designation and related factors (Industrial Economics, Incorporated 2012). The draft analysis, dated May 1, 2012, was made available for public review from May 24, 2012, through June 25, 2012 (77 FR 30988). Following the close of the comment period, a final analysis (dated July 31, 2012) of the potential economic effects of the designation was developed taking into consideration the public comments and any new information (Industrial Economics, Incorporated 2012).

The intent of the final economic analysis (FEA) is to identify and analyze the potential economic impacts associated with the critical habitat designation for these five species. The final economic analysis describes the economic impacts of all potential conservation efforts for these five fishes; some of these costs will likely be incurred regardless of whether we designate critical habitat. The economic impact of the final critical habitat designation is analyzed by comparing scenarios both “with critical habitat” and “without critical habitat.” The “without critical habitat” scenario represents the baseline for the analysis, considering protections already in place for the species (e.g., under the Federal listing and other Federal, State, and local regulations). The baseline, therefore, represents the costs incurred regardless of whether critical habitat is designated. The “with critical habitat” scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The

incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for these species. In other words, the incremental costs are those attributable solely to the designation of critical habitat above and beyond the baseline costs; these are the costs we consider in the final designation of critical habitat when evaluating the benefits of excluding particular areas under section 4(b)(2) of the Act. The analysis looks retrospectively at baseline impacts incurred since these species were listed, and forecasts both baseline and incremental impacts likely to occur with the designation of critical habitat. For a further description of the methodology of the analysis, see the “Framework for the Analysis” section of the final economic analysis.

The FEA also addresses how potential economic impacts are likely to be distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on government agencies, private businesses, and individuals. The FEA measures lost economic efficiency associated with residential and commercial development and public projects and activities, such as economic impacts on water management and transportation projects, Federal lands, small entities, and the energy industry. Decision-makers can use this information to assess whether the effects of the designation might unduly burden a particular group or economic sector. Finally, the FEA looks retrospectively at costs that have been incurred since 2011 (year of these species’ listing) (76 FR 48722), and considers those costs that may occur in the 20 years following the designation of critical habitat, which was determined to be the appropriate period for analysis because limited

planning information was available for most activities to forecast activity levels for projects beyond a 20-year timeframe. The FEA quantifies economic impacts of the five fishes conservation efforts associated with the following categories of activity: coal mining; oil and natural gas development; agriculture, ranching, and silviculture; recreational uses; dredging, channelization, impoundments, dams, and diversions; transportation (roads, highways, bridges); and residential and commercial development.

The FEA concluded that the types of conservation efforts requested by the Service during section 7 consultation regarding the five fishes were not expected to change due to critical habitat designation. The Service believes that results of consultation under the adverse modification and jeopardy standards are likely to be similar because: (1) The physical and biological features that define critical habitat are also essential for the survival of the five fishes; (2) the five fishes are limited or severely limited in their respective ranges; and (3) numbers of individuals in the surviving populations are small or very small. In addition, although two of the critical habitat units for the Cumberland darter are unoccupied, incremental impacts of the critical habitat designations will be limited for the following reasons: (1) Both units are currently occupied by the federally threatened blackside dace, *Chrosomus cumberlandensis* (listed as *Phoxinus cumberlandensis*); (2) both units are situated at least partially within the DBNF, which is managed according to a land and resource management plan that includes specific measures to protect sensitive species; and (3) both unoccupied units are located within the same hydrologic unit as three other occupied critical habitat units (Cumberland darter units 4, 6, and 8).

The FEA concludes that incremental impacts of critical habitat designation are limited to additional administrative costs of consultations and that indirect incremental impacts are unlikely to result from the designation of critical habitat for the five fishes. The present value of the total direct (administrative) incremental cost of critical habitat designation is \$644,000 over the next 20 years assuming a 7 percent discount rate, or \$56,800 on an annualized basis. Water quality management activities are likely to be subject to the greatest incremental impacts at \$273,000 over the next 20 years, followed by transportation at \$161,000; coal mining at \$79,000; oil and natural gas development at \$73,700; agriculture, ranching, and silviculture at \$36,100; dredging, channelization, impoundments, dams, and diversions at \$10,700; and recreation at \$10,000 (Industrial Economics, Inc. 2012).

In short, the FEA did not identify any disproportionate costs that are likely to result from the designation. Consequently, the Secretary is not exerting his discretion to exclude any areas from this designation of critical habitat for the five fishes based on economic impacts.

A copy of the FEA with supporting documents may be obtained by contacting the Tennessee Ecological Services Field Office (see **ADDRESSES**) or by downloading from the Internet at <http://www.regulations.gov>.

#### Exclusions Based on National Security Impacts

Under section 4(b)(2) of the Act, we consider whether there are lands owned or managed by the Department of Defense where a national security impact might exist. In

preparing this final rule, we have determined that the lands within the designation of critical habitat for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace are not owned or managed by the Department of Defense, and, therefore, we anticipate no impact on national security. Consequently, the Secretary is not exerting his discretion to exclude any areas from this final designation based on impacts on national security.

#### Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security. We consider a number of factors, including whether the landowners have developed any HCPs or other management plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at any tribal issues, and consider the government-to-government relationship of the United States with tribal entities. We also consider any social impacts that might occur because of the designation.

In preparing this final rule, we have determined that the yellowcheek darter is currently covered under a joint safe harbor agreement (SHA) and candidate conservation agreement with assurances (CCAA) in the upper Little Red River watershed in Arkansas along with the endangered speckled pocketbook mussel. The CCAA will convert to a SHA, as a result of the endangered status of the yellowcheek darter, and will be covered by an enhancement of survival permit, which expires January 1, 2044. The SHA is

strictly voluntary on the part of participating private landowners, who can opt out of the agreement at any time. This agreement provides added benefits for the recovery of the yellowcheek darter, but does not guarantee long-term protection of habitat. The properties enrolled in the SHA are not technically included in the critical habitat designation, which includes only the stream channel within the ordinary high water line. Because these waters are technically state owned, we cannot exclude them from the designation. The CCAA provides assurances to enrolled landowners that if additional conservation measures are necessary to respond to changed circumstances, we will not require such measures in addition to those provided for in the agreement without the consent of the landowner if the species becomes listed. However like the SHA, the properties enrolled in the CCAA are not technically included in the critical habitat designation, which includes only the stream channel within the ordinary high water line. Because these waters are technically state owned, we cannot exclude them from the designation.

There are currently no HCPs or other management plans for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, or laurel dace, and the final designation does not include any tribal lands or trust resources. We anticipate no impact on tribal lands, partnerships, or HCPs from this critical habitat designation.

Accordingly, the Secretary is not exercising his discretion to exclude any areas from this final designation based on other relevant impacts.

## **Required Determinations**

*Regulatory Planning and Review — Executive Order 12866 and 13563*

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) will review all significant rules. The Office of Information and Regulatory Affairs has determined that this rule is not significant.

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

*Regulatory Flexibility Act (5 U.S.C. 601 et seq.)*

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 (5 U.S.C. 801 *et seq.*), whenever an agency must publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (small businesses, small organizations, and small government jurisdictions). However, no

regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities. In this final rule, we are certifying that the critical habitat designation for these five fishes will not have a significant economic impact on a substantial number of small entities. The following discussion explains our rationale.

According to the Small Business Administration, small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; as well as small businesses. Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than \$5 million in annual sales, general and heavy construction businesses with less than \$27.5 million in annual business, special trade contractors doing less than \$11.5 million in annual business, and agricultural businesses with annual sales less than \$750,000. To determine if potential economic impacts on these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule, as well as the types of project modifications that may result. In general, the term “significant economic impact” is meant to apply to a typical small business firm's business operations.



To determine if the rule could significantly affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (e.g., coal mining; agriculture, ranching, and silviculture; oil and natural gas development; recreational uses; dredging, channelization, impoundments, dams, and diversions; and transportation (roads, highways, bridges)). We apply the “substantial number” test individually to each industry to determine if certification is appropriate. However, the SBREFA does not explicitly define “substantial number” or “significant economic impact.” Consequently, to assess whether a “substantial number” of small entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is substantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat only affects activities authorized, funded, or carried out by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. In areas where the five fishes are present, Federal agencies already are required to consult with us under section 7 of the Act on activities they authorize, fund, or carry out that may affect the five fishes. Federal agencies also must consult with us if their activities may affect critical habitat. Designation of critical habitat, therefore, could result in an additional economic impact on small entities due to the requirement to reinitiate consultation for ongoing Federal activities (see *Application of the “Adverse Modification” Standard* section).

In our FEA of the critical habitat designation (see “Exclusions Based on Economic Impacts” above, we evaluated the potential economic effects on small business entities resulting from conservation actions related to the designation of critical habitat of the five fishes. The analysis is based on the estimated impacts associated with the rulemaking as described in Appendix A of the FEA and evaluates the potential for economic impacts related to: Coal mining; oil and natural gas development; recreation; dredging, channelization, impoundments, dams, and diversions; and transportation (roads, highways, bridges).

For activities related to coal mining, we anticipate that 10 small entities could be affected in a single year at a cost of \$875 each, representing less than 3 percent of annual revenues. For oil and natural gas development, we estimate that two small entities could be affected within a single year at a cost of \$875 each, representing less than 3 percent of annual revenues. For recreation activities, it is estimated that one small entity could be affected within a single year at a cost of \$4,150. This cost to this entity is estimated to be 29 percent of the entity’s annual revenue from cattle sales; however, the entity has other revenues, and this percentage is likely overstated. For activities relating to by dredging, channelization, impoundments, dams, and diversions, one small entity could be affected within a single year, at a cost of \$2,630, representing less than 1 percent of annual revenues. For transportation activities, one small entity could be affected within a single year, at a cost of \$1,750, representing less than 1 percent of annual revenues. Please refer to the FEA of the critical habitat designation for a more detailed discussion of potential economic impacts.

In summary, we considered whether this designation will result in a significant economic effect on a substantial number of small entities. Based on the above reasoning and currently available information, we concluded that this rule will not result in a significant economic impact on a substantial number of small entities. Therefore, we are certifying that the designation of critical habitat for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

*Energy Supply, Distribution, or Use—Executive Order 13211*

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. We do not expect this designation to significantly affect energy supplies, distribution, or use. Natural gas and oil exploration and development activities occur or could potentially occur within the Cumberland darter (13 of 15 critical habitat units) and yellowcheek darter (4 of 4 critical habitat units) critical habitat units. However, compliance with State regulatory requirements or voluntary BMPs would be expected to minimize impacts of natural gas and oil exploration and development in the areas of designated critical habitat for both species. The measures for natural gas and oil exploration and development are generally not considered a substantial cost compared to overall project costs and are already being implemented by oil and gas companies.

Coal mining occurs or could potentially occur in 11 of the 15 proposed critical habitat units for the Cumberland darter, and coal mining could potentially occur in 1 of the 6 critical habitat units for the laurel dace. Incidental take for listed species associated with surface coal mining activities is currently covered under a programmatic, non-jeopardy biological opinion between the Office of Surface Mining and the Service completed in 1996 (Service 1996, entire). The biological opinion covers existing, proposed, and future endangered and threatened species that may be affected by the implementation and administration of surface coal mining programs under the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 *et seq.*). Through its analysis, the Service concluded that the proposed action (surface coal mining and reclamation activities) was not likely to jeopardize the continued existence of any threatened, endangered, or proposed species or result in adverse modification of designated or proposed critical habitat.

OMB has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute “a significant adverse effect” when compared to not taking the regulatory action under consideration. The potential effects of this designation on oil and gas development were considered in the economics analysis. The FEA finds that impacts to oil and gas development activities will be anticipated, but they will be limited to the administrative costs of consultation. Therefore, reductions in oil and gas production are not anticipated, and consultation costs are not anticipated to increase the cost of energy production or distribution in the United States in excess of 1 percent. Thus, none of the nine outcome thresholds of impacts is exceeded. The economic analysis finds that none of these criteria is relevant to this analysis. Thus, based on

information in the economic analysis, energy-related impacts associated with these five fishes' conservation activities within critical habitat are not expected. As such, the designation of critical habitat is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

*Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)*

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*), we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, tribal governments, or the private sector and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)-(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or tribal governments" with two exceptions. It excludes "a condition of Federal assistance." It also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which \$500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or otherwise decrease, the Federal Government's responsibility to

provide funding,” and the State, local, or tribal governments “lack authority” to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. “Federal private sector mandate” includes a regulation that “would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.”

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe that this rule will significantly or uniquely affect small governments. The lands with Cumberland darter critical habitat designation are owned by the DBNF and private landowners. The lands with rush darter critical habitat designation are mostly owned by private landowners; a small portion of the City of Pinson; and road easements in Etowah, Jefferson, and Winston Counties, Alabama. The lands designated as critical habitat for the yellowcheek darter are mostly owned by private landowners and road easements in Cleburne, Searcy, Stone, and Van Buren Counties, Arkansas. Most of the lands designated as critical habitat for the Chucky madtom are private, except for a small portion consisting of road easements in Greene County, Tennessee. Most of the lands designated as critical habitat for the laurel dace are located on private lands, except for a small portion consisting of road easements in Bledsoe, Rhea, and Sequatchie Counties, Tennessee. Consequently, we do not believe that the critical habitat designation would significantly or uniquely affect small government entities. As such, a Small Government Agency Plan is not required.

*Takings – Executive Order 12630*

In accordance with Executive Order 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace in a takings implications assessment. As discussed above, the designation of critical habitat affects only Federal actions. Although private parties that receive Federal funding, assistance, or require

approval or authorization from a Federal agency for an action may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Therefore, the takings implications assessment concludes that this designation of critical habitat for these five species does not pose significant takings implications for lands within or affected by the designation.

#### *Federalism – Executive Order 13132*

In accordance with Executive Order 13132 (Federalism), this rule does not have significant Federalism effects. A federalism impact summary statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of, this critical habitat designation with appropriate State resource agencies in Kentucky, Alabama, Arkansas, and Tennessee. We received one comment from the Kentucky Department of Fish and Wildlife Resources related to road crossings and culverts acting as threats to the Cumberland darter. This comment was incorporated into this final rule. We did not receive any other comments from the four affected States. The designation of critical habitat in areas currently occupied by these five fishes may impose nominal additional regulatory restrictions to those currently in place and, therefore, may have little incremental impact on State and local governments and their activities. The designation may have some benefit to these governments because the areas that contain the physical and biological features essential to the conservation of the species are more clearly



defined, and the elements of the features of the habitat necessary to the conservation of these species are specifically identified. This information does not alter where and what Federally sponsored activities may occur. However, it may assist these local governments in long-range planning (rather than having them wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

#### *Civil Justice Reform – Executive Order 12988*

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. This final rule uses standard property descriptions and identifies the elements of physical and biological features essential to the conservation of the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, and laurel dace within the designated areas to assist the public in understanding the habitat needs of these species.

*Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)*

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

*National Environmental Policy Act (42 U.S.C. 4321 et seq.)*

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County v. Babbitt*, 48 F. 3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

*Government-to-Government Relationship with Tribes*

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and the Department of Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to tribes.

We determined that there are no tribal lands that were occupied by the Cumberland darter, rush darter, yellowcheek darter, Chucky madtom, or laurel dace at the time of listing that contain the features essential for conservation of these species, and no tribal lands unoccupied by these five species that are essential for the conservation of these species. Therefore, we are not designating critical habitat for these five species on tribal lands.

## **References Cited**

A complete list of references cited is available on the Internet at <http://www.regulations.gov> and upon request from the Tennessee Ecological Services Field Office (see **ADDRESSES**).

## **Authors**

The primary authors of this package are the staff members of the Arkansas, Kentucky, Mississippi, and Tennessee Ecological Services Field Offices.

## **List of Subjects in 50 CFR Part 17**

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

## **Regulation Promulgation**

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

### **PART 17—[AMENDED]**

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by revising the entries for “Dace, laurel,” “Darter, Cumberland,” “Darter, rush,” “Darter, yellowcheek,” and “Madtom, chucky” under FISHES in the List of Endangered and Threatened Wildlife to read as follows:

**§ 17.11 Endangered and threatened wildlife.**

\* \* \* \* \*

(h) \* \* \*

Species		Vertebrate						
		population where		endangered or		When	Critical	Special
Common name	Scientific name	Historic range	threatened	Status	listed	habitat	rules	

\* \* \* \* \*

## FISHES

\* \* \* \* \*

Dace, laurel	<i>Chrosomus saylori</i>	U.S.A. (TN)	Entire	E	791	17.95(e)	NA
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\* \* \* \* \*

Darter, Cumberland	<i>Etheostoma susanae</i>	U.S.A. (KY, TN)	Entire	E	791	17.95(e)	NA
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\* \* \* \* \*

Darter, rush	<i>Etheostoma phytophilum</i>	U.S.A. (AL)	Entire	E	791	17.95(e)	NA
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\* \* \* \* \*

Darter, yellowcheek	<i>Etheostoma moorei</i>	U.S.A. (AR)	Entire	E	791	17.95(e)	NA
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\* \* \* \* \*

Madtom, Chucky	<i>Noturus crypticus</i>	U.S.A. (TN)	Entire	E	791	17.95(e)	NA
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\* \* \* \* \*

3. In § 17.95, amend paragraph (e) by adding entries for “Laurel Dace (*Chrosomus saylori*)”, “Cumberland Darter (*Etheostoma susanae*)”, “Rush Darter (*Etheostoma phytophilum*)”, “Yellowcheek Darter (*Etheostoma moorei*)”, and “Chucky Madtom (*Noturus crypticus*)” in the same order that those species appear in the table at § 17.11(h), to read as follows:

**§ 17.95 Critical habitat—fish and wildlife.**

\* \* \* \* \*

(e) *Fishes.*

\* \* \* \* \*

Laurel Dace (*Chrosomus saylori*)

(1) Critical habitat units are depicted for Bledsoe, Rhea, and Sequatchie Counties, Tennessee, on the maps below.

(2) Within these areas, the primary constituent elements of the physical and biological features essential to the conservation of the laurel dace consist of five components:



(i) Pool and run habitats of geomorphically stable, first- to second-order streams with riparian vegetation; cool, clean, flowing water; shallow depths; and connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(ii) Stable bottom substrates composed of relatively silt-free gravel, cobble, and slab-rock boulder substrates with undercut banks and canopy cover. Relatively silt-free is defined for the purpose of this rule as silt or fine sand within interstitial spaces of substrates in amounts low enough to have minimal impact to the species.

(iii) An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(iv) Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the laurel dace.

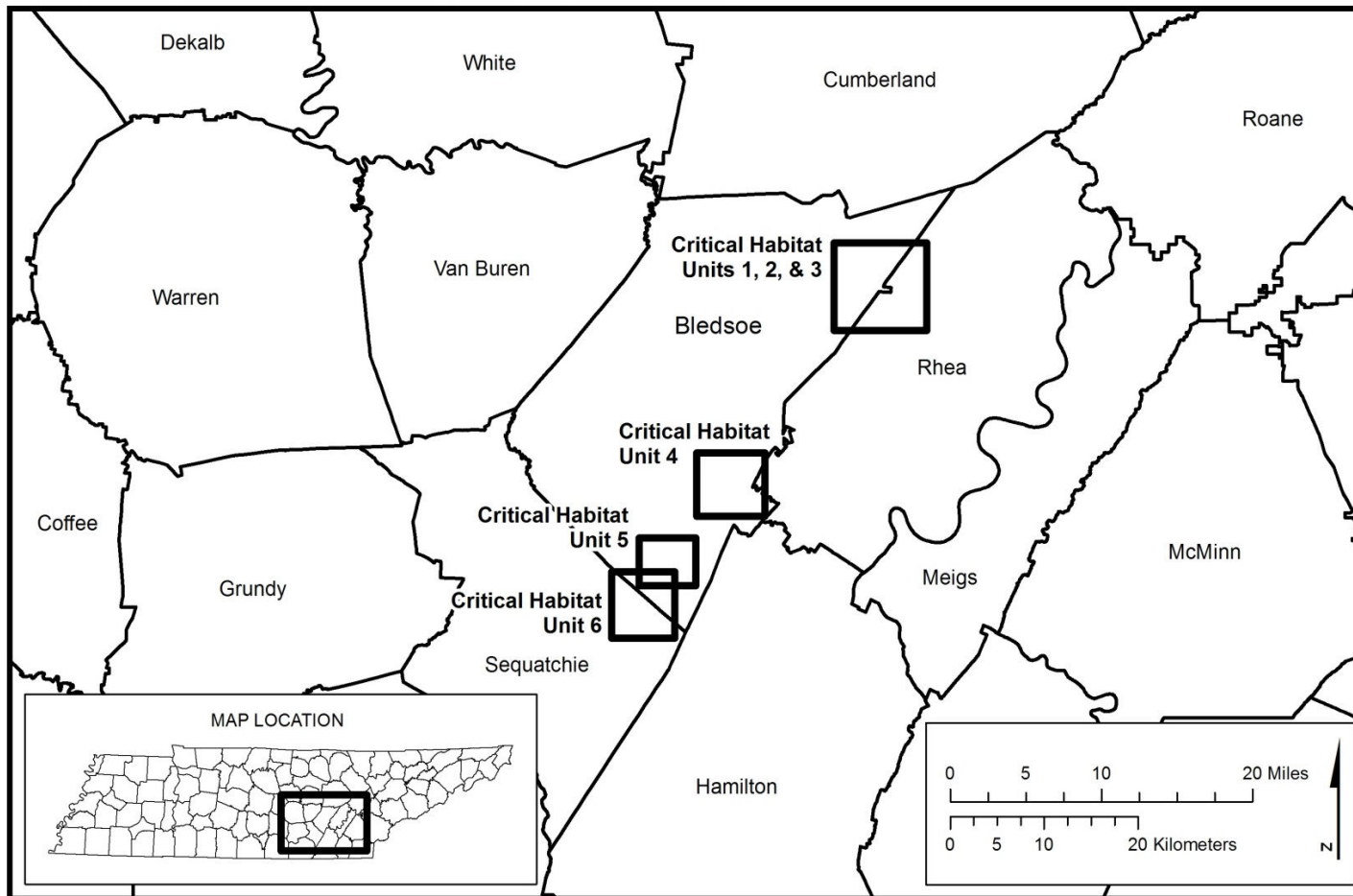
(v) Prey base of aquatic macroinvertebrates, including midge larvae, caddisfly larvae, and stonefly larvae.

(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on **[INSERT DATE 30 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**.

(4) *Critical habitat unit maps.* Data layers defining map units were created on a base of USGS digital ortho-photo quarter-quadrangles, and critical habitat units were then mapped using Tennessee State Plane, Lambert Conformal Conic Projection, units feet. Upstream and downstream limits were then identified by longitude and latitude using decimal degrees and projected in WGS 1984. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the field office internet site (<http://www.fws.gov/cookeville>), <http://www.regulations.gov> at Docket No. FWS–R4–ES–2011–0074, and at the Service’s Tennessee Fish and Wildlife Office. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Index map follows:

## Overview of Critical Habitat Locations for Laurel Dace in Tennessee



(6) Units 1, 2, and 3: Bumbee Creek and Youngs Creek, Bledsoe and Rhea Counties, Tennessee; and Moccasin Creek, Bledsoe County, Tennessee.

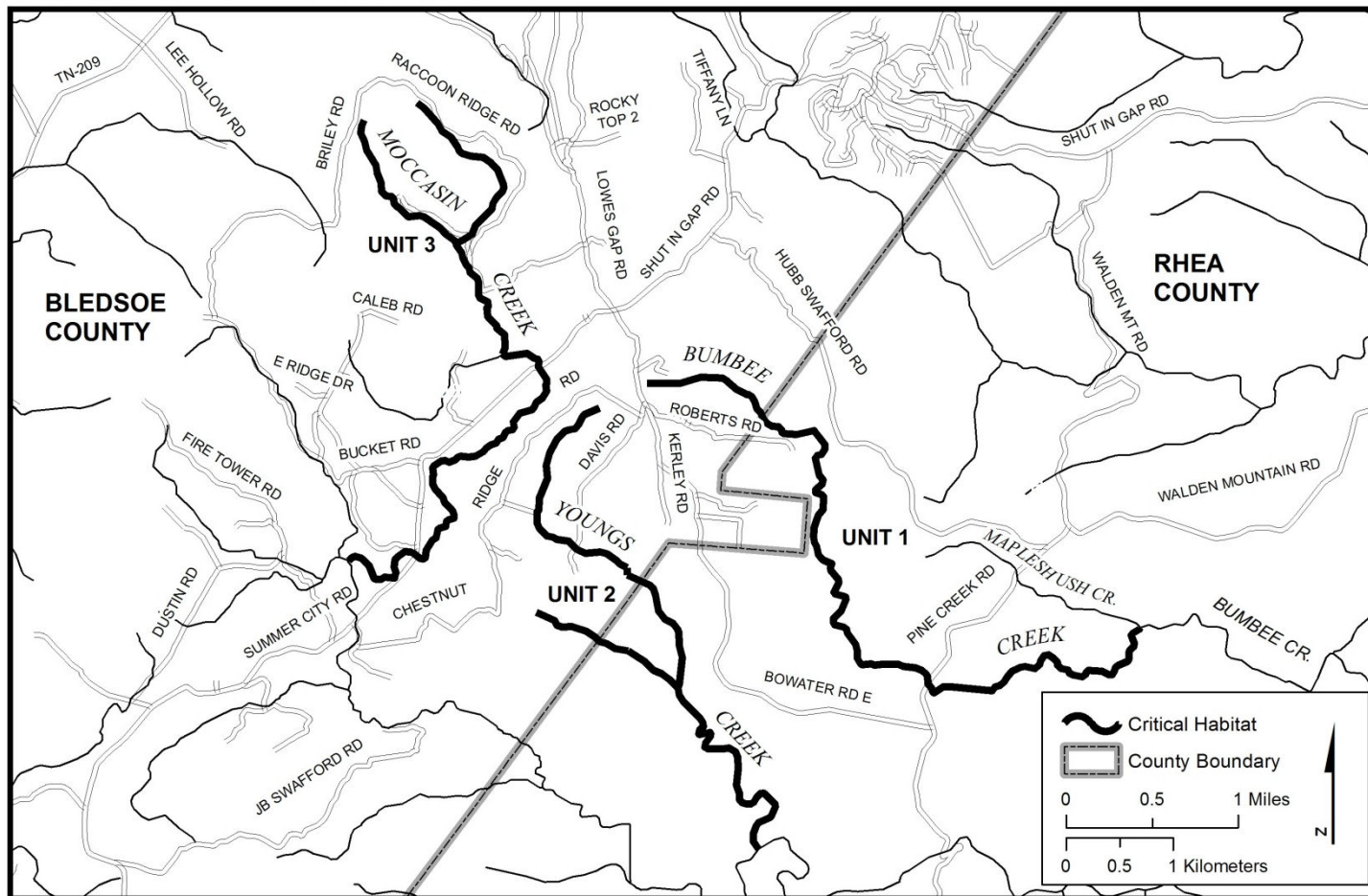
(i) Unit 1 includes 7.8 river kilometers (rkm) (4.8 river miles (rmi)) of Bumbee Creek from its headwaters in Bledsoe County, downstream to its confluence with Mapleslush Branch in Rhea County, Tennessee.

(ii) Unit 2 includes 7.9 rkm (4.9 rmi) of Youngs Creek from its headwaters in Bledsoe County, downstream to its confluence with Moccasin Creek in Rhea County, Tennessee.

(iii) Unit 3 includes 9.0 rkm (5.6 rmi) of Moccasin Creek from its headwaters downstream to 0.1 rkm (0.6 rmi) below its confluence with Lick Creek in Bledsoe County, Tennessee.

(iv) Map of Units 1, 2, and 3 of critical habitat for the laurel dace follows:

Map of Units 1 (Bumbee Creek), 2 (Youngs Creek), and 3 (Moccasin Creek)  
of critical habitat for the laurel dace

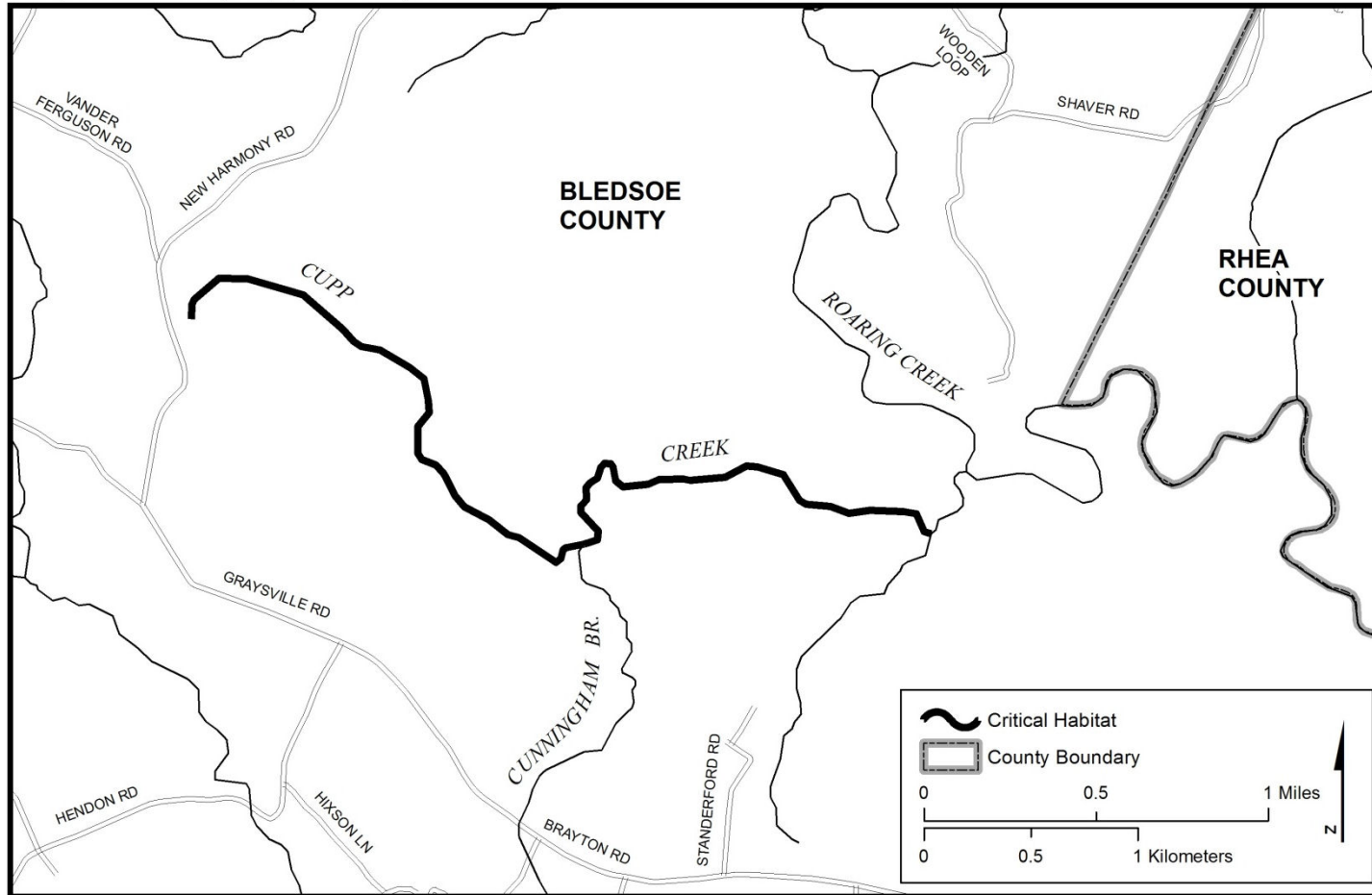


(7) Unit 4: Cupp Creek, Bledsoe County, Tennessee.

(i) Unit 4 includes 5.0 rkm (3.1 rmi) of Cupp Creek from its headwaters downstream to its confluence with an unnamed tributary in Bledsoe County, Tennessee.

(ii) Map of Unit 4 of critical habitat for the laurel dace follows:

Map of Unit 4 (Cupp Creek) of critical habitat for the laurel dace



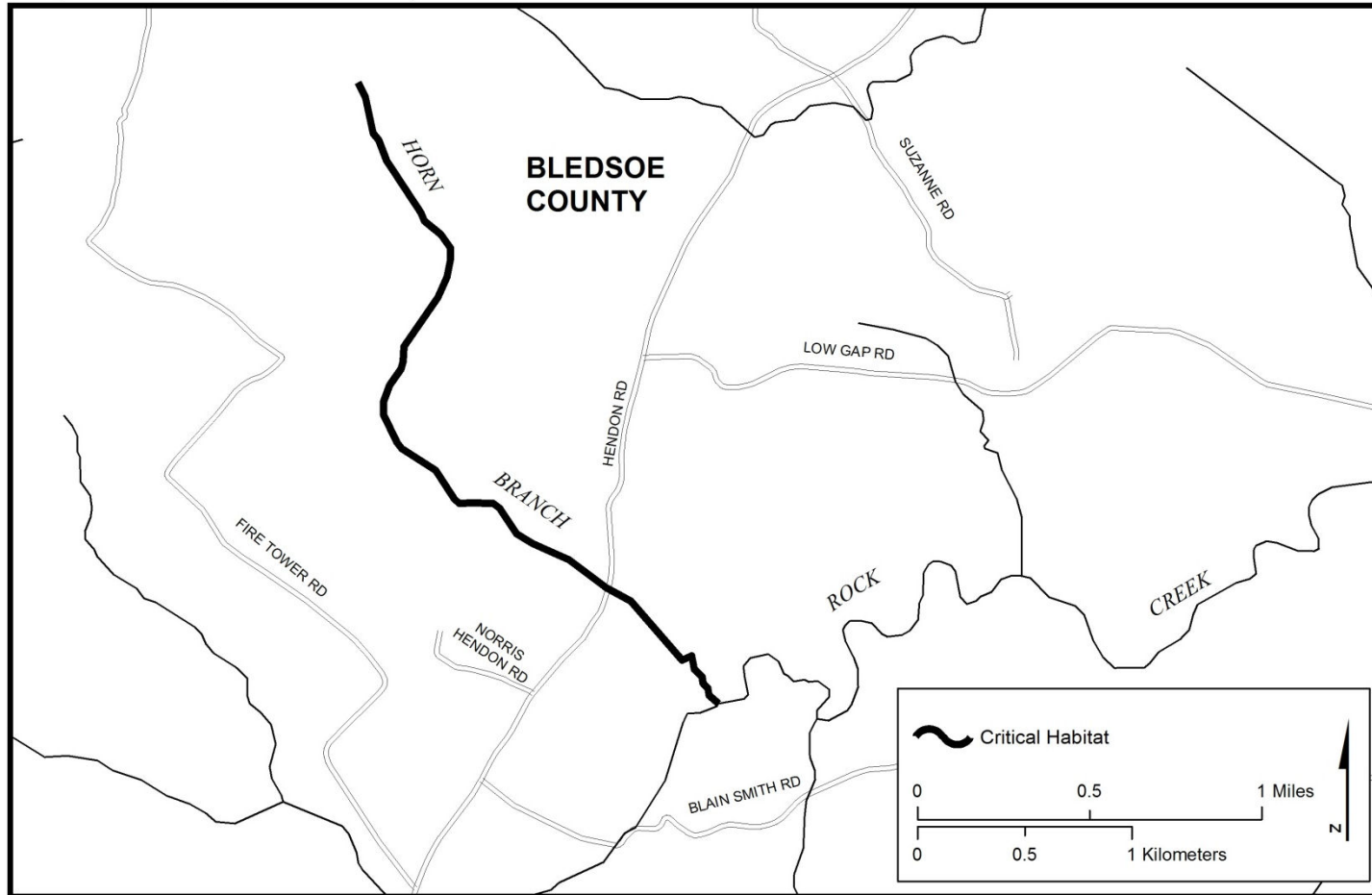
(8) Unit 5: Horn Branch, Bledsoe County, Tennessee.

(i) Unit 5 includes 4.0 rkm (2.5 rmi) of Horn Branch from its headwaters downstream to its confluence with Rock Creek, Bledsoe County, Tennessee.

(ii) Map of Unit 5 of critical habitat for the laurel dace follows:



Map of Unit 5 (Horn Branch) of critical habitat for the laurel dace

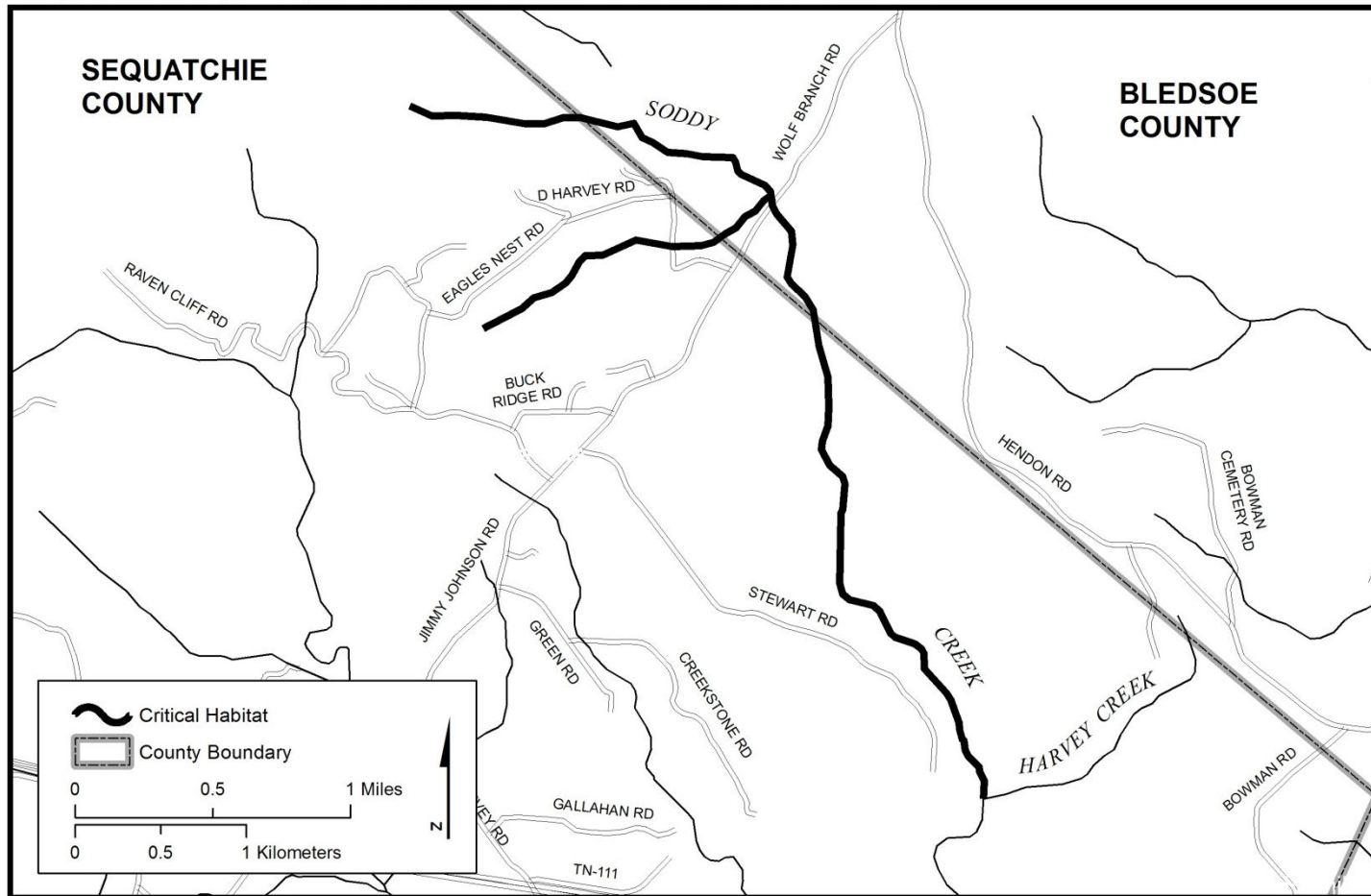


(9) Unit 6: Soddy Creek, Sequatchie and Bledsoe Counties, Tennessee.

(i) Unit 6 includes 8.4 rkm (5.2 rmi) of Soddy Creek from its headwaters in Sequatchie County, downstream to its confluence with Harvey Creek in Sequatchie County, Tennessee.

(ii) Map of Unit 6 of critical habitat for the laurel dace follows:

Map of Unit 6 (Soddy Creek) of critical habitat for the laurel dace



\* \* \* \* \*

Cumberland Darter (*Etheostoma susanae*)

(1) Critical habitat units are depicted for McCreary and Whitley Counties, Kentucky, and Campbell and Scott Counties, Tennessee, on the maps below.

(2) Within these areas, the primary constituent elements of the physical and biological features essential to the conservation of the Cumberland darter consist of five components:

(i) Shallow pools and gently flowing runs of geomorphically stable, second- to fourth-order streams with connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(ii) Stable bottom substrates composed of relatively silt-free sand and sand-covered bedrock, boulders, large cobble, woody debris, or other cover.

(iii) An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(iv) Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the Cumberland darter.

(v) Prey base of aquatic macroinvertebrates, including midge larvae, mayfly nymphs, caddisfly larvae, and microcrustaceans.

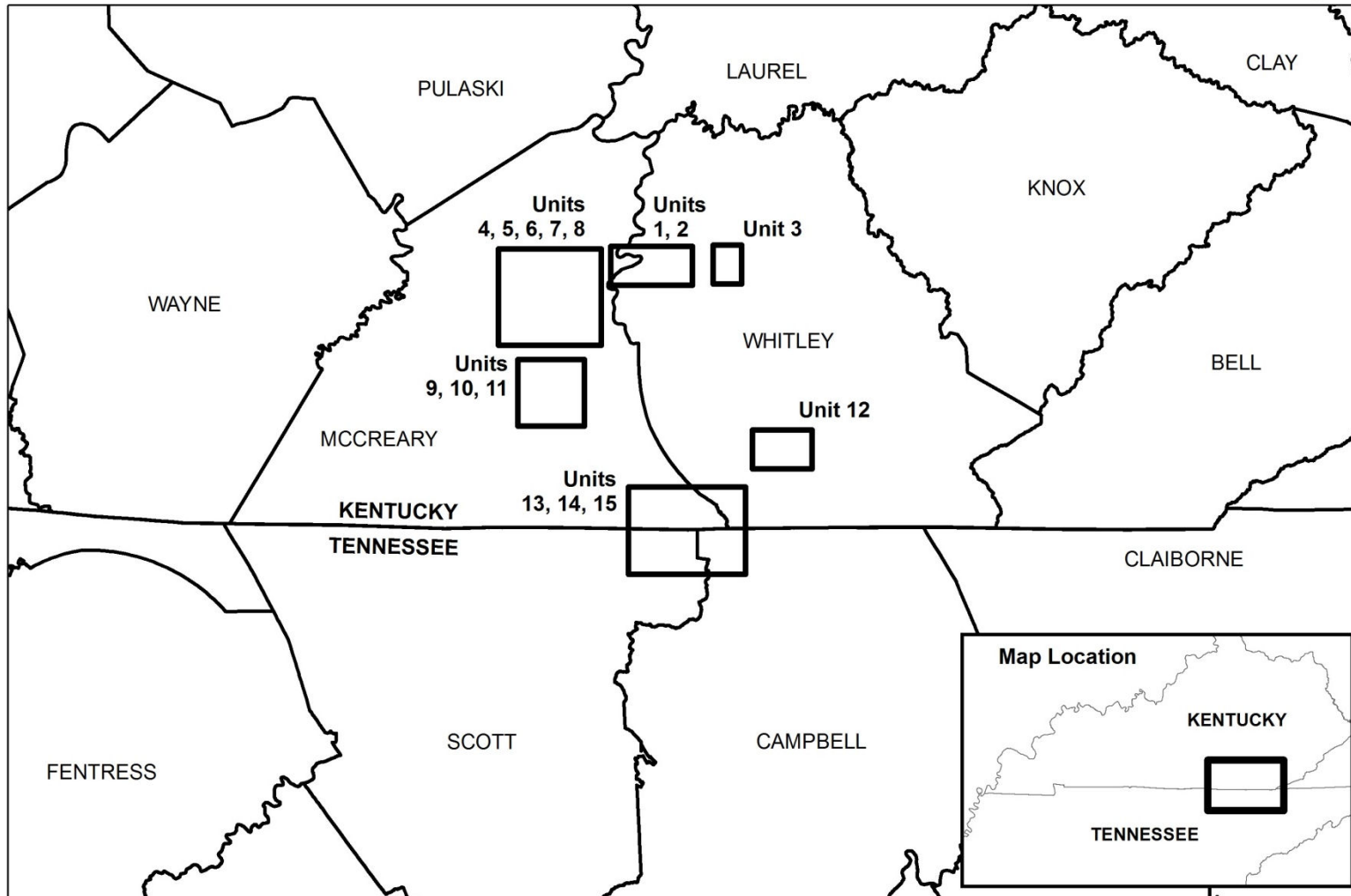
(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, bridges, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on **[INSERT DATE 30 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**.

(4) *Critical habitat map units.* Data layers defining map units were created on a base of USGS digital ortho-photo quarter-quadrangles, and critical habitat units were then mapped using Tennessee State Plane, Lambert Conformal Conic Projection, units feet. Upstream and downstream limits were then identified by longitude and latitude using decimal degrees and projected in WGS 1984. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the field office internet site (<http://www.fws.gov/cookeville>), <http://www.regulations.gov> at Docket No. FWS-R4-ES-2011-0074, and at the Service's Tennessee Fish and Wildlife Office. You may obtain field office location information by

contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Index map\_follows:

## Overview of Critical Habitat Locations for the Cumberland Darter in Tennessee and Kentucky



(6) Units 1 and 2: Bunches Creek and Calf Pen Fork, Whitley County, Kentucky.

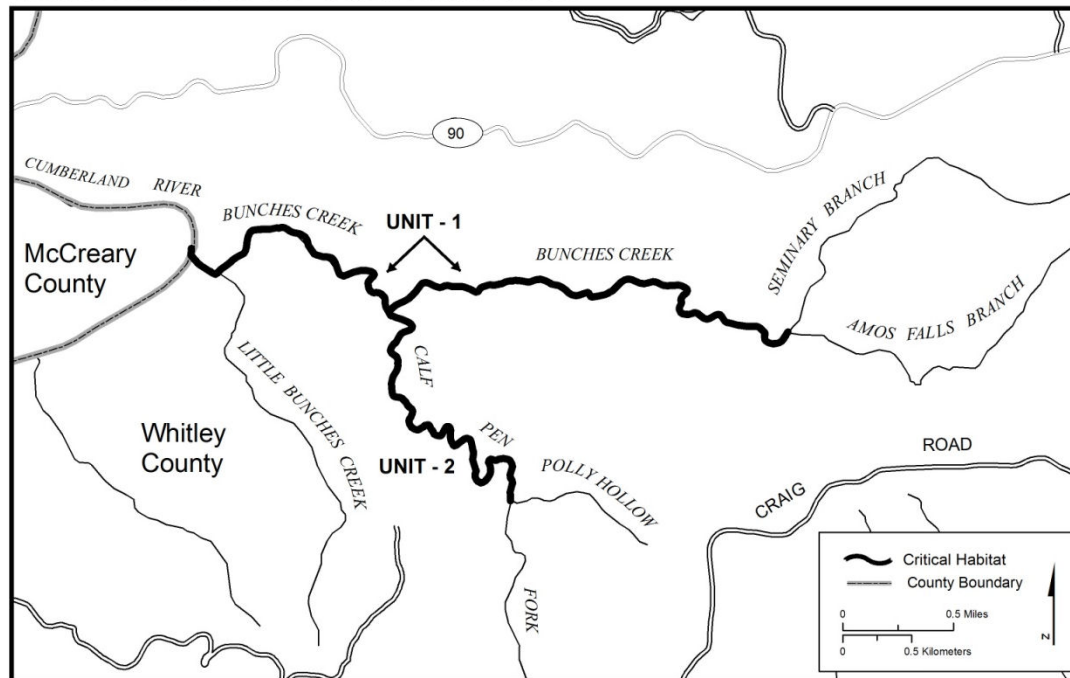
(i) Unit 1 includes 5.8 river kilometers (rkm) (3.6 river miles (rmi)) of Bunches Creek from the Seminary Branch and Amos Falls Branch confluence downstream to its confluence with the Cumberland River.

(ii) Unit 2 includes 2.9 rkm (1.8 rmi) of Calf Pen Fork from its confluence with Polly Branch downstream to its confluence with Bunches Creek.

(iii) Map of Units 1 and 2 of critical habitat for the Cumberland darter follows:



Map of Units 1 (Bunches Creek) and 2 (Calf Pen Fork) of critical habitat for the Cumberland darter

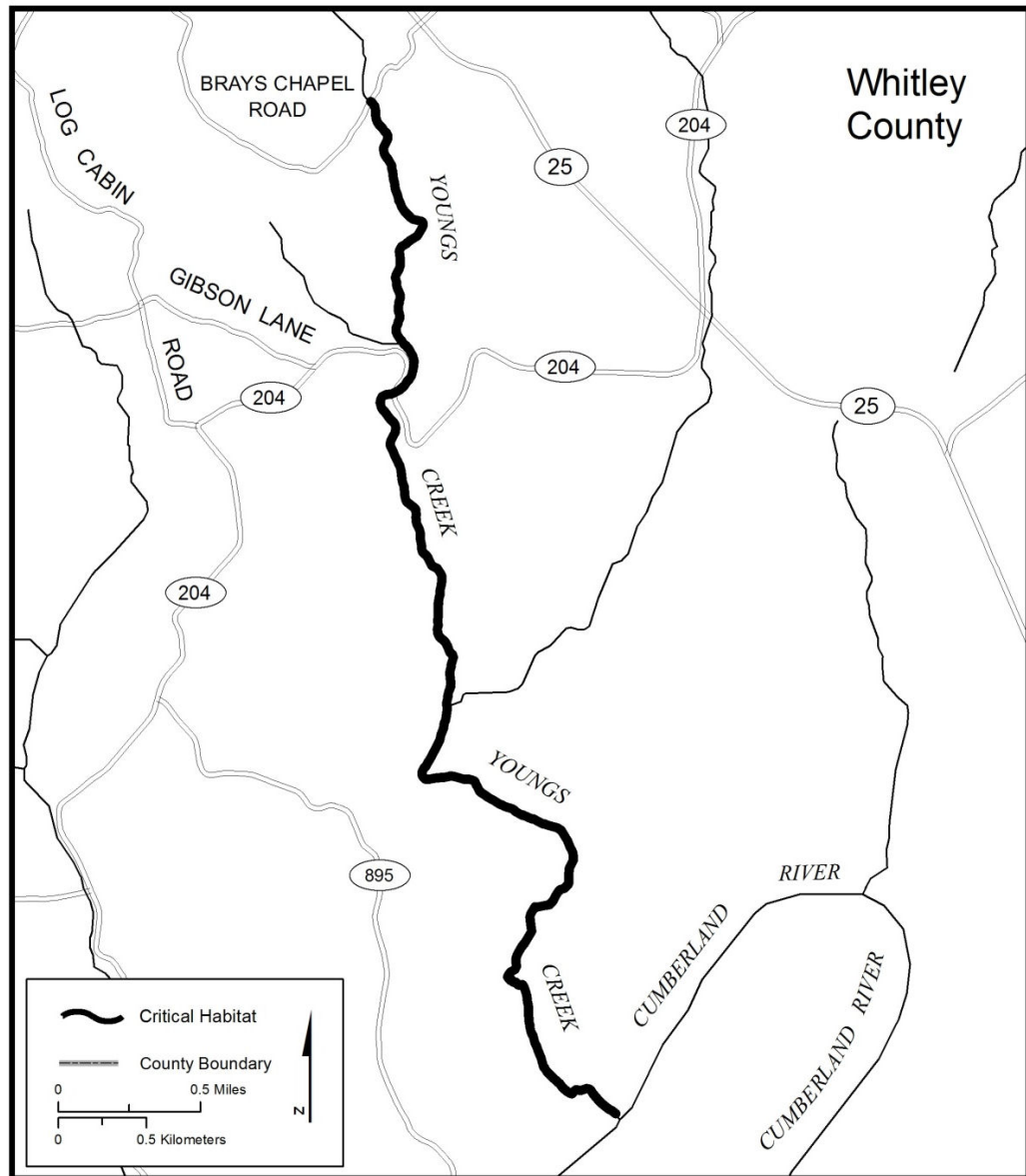


(7) Unit 3: Youngs Creek, Whitley County, Kentucky.

(i) Unit 3 includes 7.4 rkm (4.6 rmi) of Youngs Creek from Brays Chapel Road downstream to its confluence with the Cumberland River.

(ii) Map of Unit 3 of critical habitat for the Cumberland darter follows:

Map of Unit 3 (Youngs Creek) of critical habitat for the Cumberland darter



(8) Units 4, 5, 6, 7, and 8: Barren Fork, Indian Creek, Cogur Fork, Kilburn Fork, and Laurel Fork, McCreary County, Kentucky.

(i) Unit 4 includes 6.3 rkm (3.9 rmi) of Barren Fork from its confluence with an unnamed tributary downstream to its confluence with Indian Creek.

(ii) Unit 5 includes 4.0 rkm (2.5 rmi) of Indian Creek from its confluence with an unnamed tributary downstream to its confluence with Barren Fork.

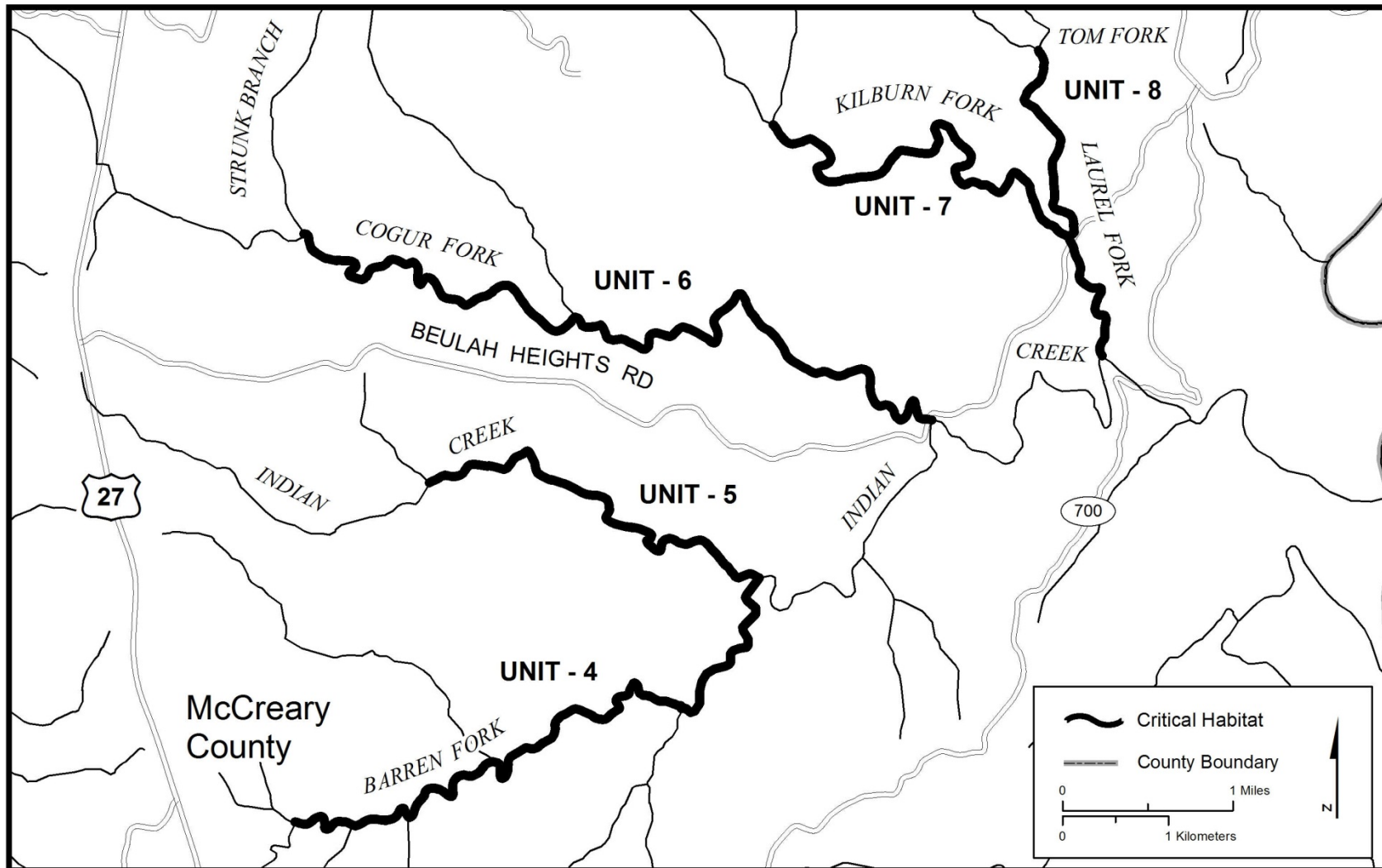
(iii) Unit 6 includes 8.6 rkm (5.4 rmi) of Cogur Fork from its confluence with Strunk Branch downstream to its confluence with Indian Creek.

(iv) Unit 7 includes 4.6 rkm (2.9 rmi) of Kilburn Fork from its confluence with an unnamed tributary downstream to its confluence with Laurel Fork.

(v) Unit 8 includes 3.5 rkm (2.2 rmi) of Laurel Fork from its confluence with Toms Fork downstream to its confluence with Indian Creek.

(vi) Map of Units 4, 5, 6, 7, and 8 of critical habitat for the Cumberland darter follows:

Map of Units 4 (Barren Fork), 5 (Indian Creek), 6 (Cogur Fork), 7 (Kilburn Fork), and 8 (Laurel Fork) of critical habitat for the Cumberland darter



(9) Units 9, 10, and 11: Laurel Creek, Elisha Branch, and Jenneys Branch, McCreary County, Kentucky.

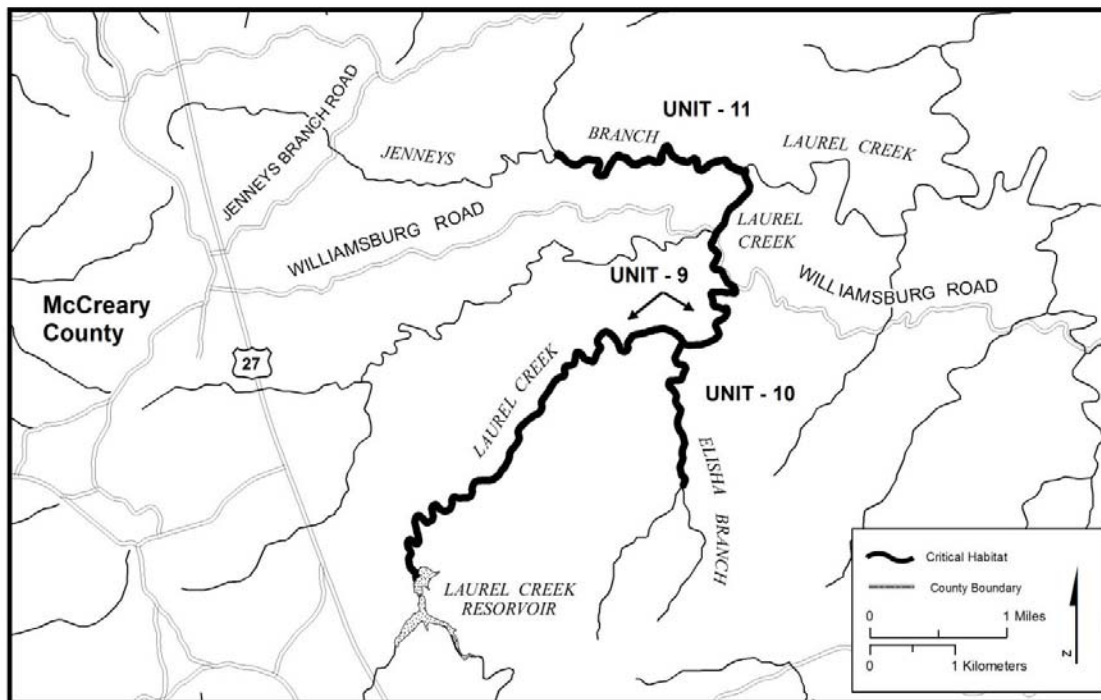
(i) Unit 9 includes 9.4 rkm (5.9 rmi) of Laurel Creek from Laurel Creek Reservoir downstream to its confluence with Jenneys Branch.

(ii) Unit 10 includes 2.1 rkm (1.3 rmi) of Elisha Branch from its confluence with an unnamed tributary downstream to its confluence with Laurel Creek.

(iii) Unit 11 includes 3.1 rkm (1.9 rmi) of Jenneys Branch from its confluence with an unnamed tributary downstream to its confluence with Laurel Creek.

(iv) Map of Units 9, 10, and 11 of critical habitat for the Cumberland darter follows:

Map of Units 9 (Laurel Creek), 10 (Elisha Fork), and 11 (Jenneys Branch) of critical habitat for the Cumberland darter

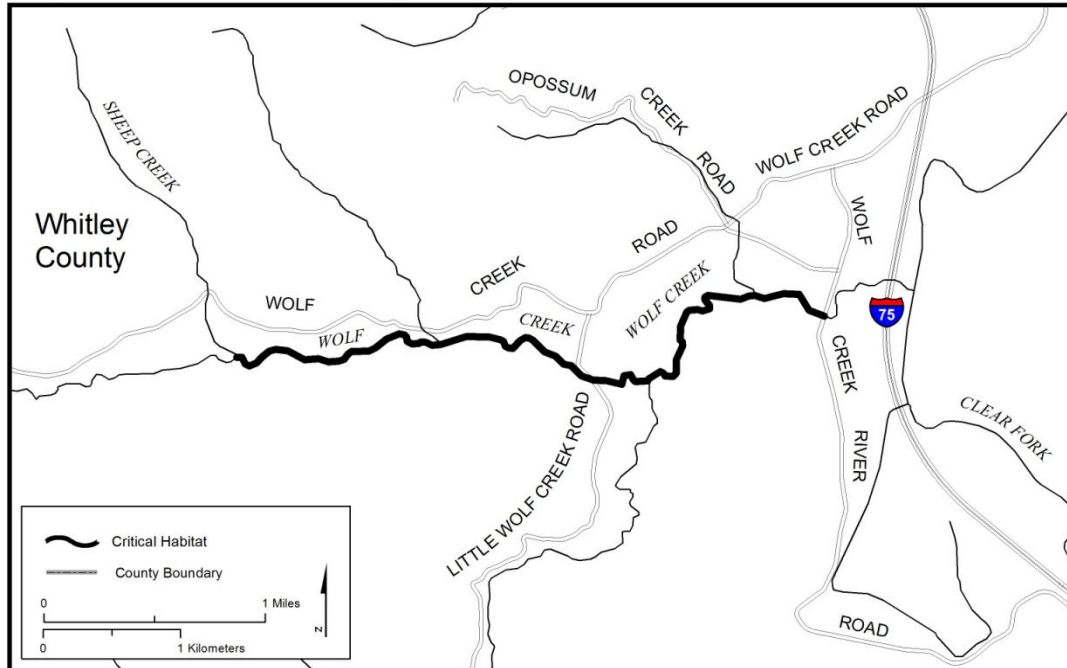


(10) Unit 12: Wolf Creek, Whitley County, Kentucky.

(i) Unit 12 includes 6.3 rkm (3.9 rmi) of Wolf Creek from its confluence with Sheep Creek downstream to its intersection with Wolf Creek River Road.

(ii) Map of Unit 12 of critical habitat for the Cumberland darter follows:

Map of Unit 12 (Wolf Creek) of critical habitat for the Cumberland darter





(11) Units 13, 14, and 15: Jellico Creek, Rock Creek, and Capuchin Creek, McCreary and Whitley Counties, Kentucky, and Campbell and Scott Counties, Tennessee.

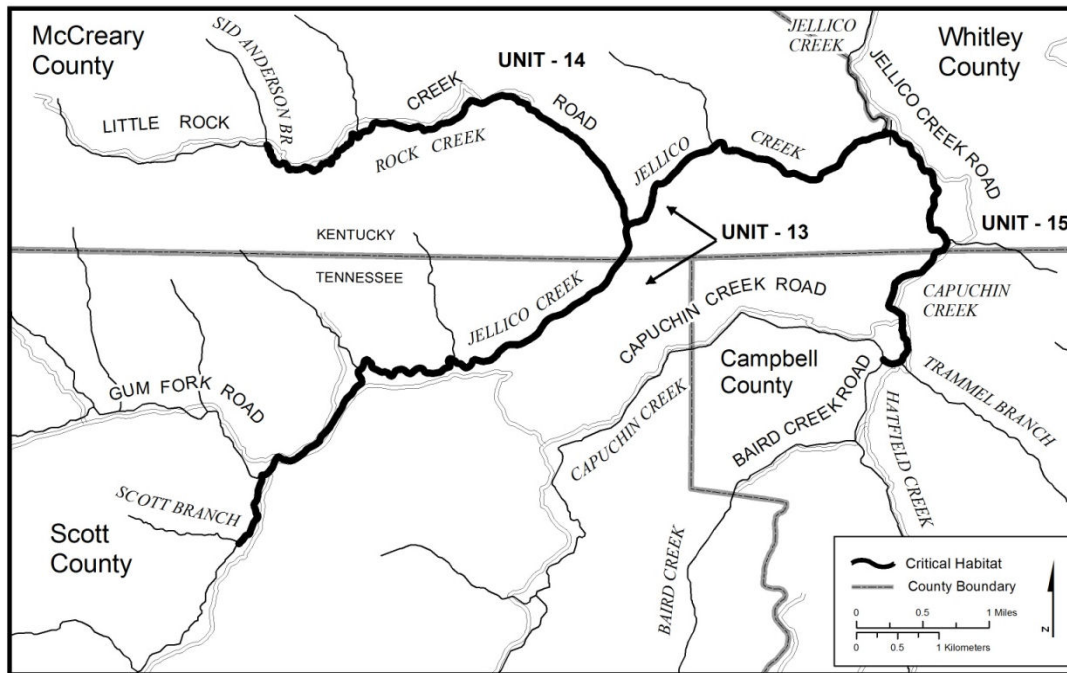
(i) Unit 13 includes 11.5 rkm (7.2 rmi) of Jellico Creek from its confluence with Scott Branch, Scott County, Tennessee, downstream to its confluence with Capuchin Creek, McCreary County, Kentucky.

(ii) Unit 14 includes 6.1 rkm (3.8 rmi) of Rock Creek from its confluence with Sid Anderson Branch downstream to its confluence with Jellico Creek.

(iii) Unit 15 includes 4.2 rkm (2.6 rmi) of Capuchin Creek from its confluence with Hatfield Creek downstream to its confluence with Jellico Creek.

(iv) Map of Units 13, 14, and 15 of critical habitat for the Cumberland darter follows:

Map of Units 13 (Jellico Creek), 14 (Rock Creek), and 15 (Capuchin Creek) of critical habitat for the Cumberland darter



This map is provided for illustrative purposes of critical habitat only. For precise legal definition of critical habitat, please refer to the narrative unit descriptions.

\* \* \* \* \*

Rush Darter (*Etheostoma phytophilum*)

(1) The critical habitat units are depicted for Jefferson, Winston, and Etowah Counties in Alabama, on the maps below.

(2) Within these areas, the primary constituent elements of the physical and biological features essential to the conservation of the rush darter consist of five components:

(i) Springs and spring-fed reaches of geomorphically stable, relatively low-gradient, headwater streams with appropriate habitat (bottom substrates) to maintain essential riffles, runs, and pools; emergent vegetation in shallow water and on the margins of small streams and spring runs; cool, clean, flowing water; and connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(ii) Stable bottom substrates consisting of a combination of sand with silt, muck, gravel, or bedrock and adequate emergent vegetation in shallow water on the margins of small permanent and ephemeral streams and spring runs.

(iii) Instream flow with moderate velocity and a continuous daily discharge that

allows for a longitudinal connectivity regime inclusive of both surface runoff and groundwater sources (springs and seepages) and exclusive of flushing flows caused by stormwater runoff.

(iv) Water quality with temperature not exceeding 26.7 °C (80 °F), dissolved oxygen 6.0 milligrams or greater per liter (mg/L), turbidity of an average monthly reading of 10 Nephelometric Turbidity Units (NTU; units used to measure sediment discharge) and 15 mg/L total suspended solids (TSS; measured as mg/L of sediment in water ) or less; and a specific conductance (ability of water to conduct an electric current, based on dissolved solids in the water) of no greater than 225 micro Siemens per centimeter at 26.7 °C (80 °F).

(v) Prey base of aquatic macroinvertebrates, including midge larvae, mayfly nymphs, blackfly larvae, beetles, and microcrustaceans.

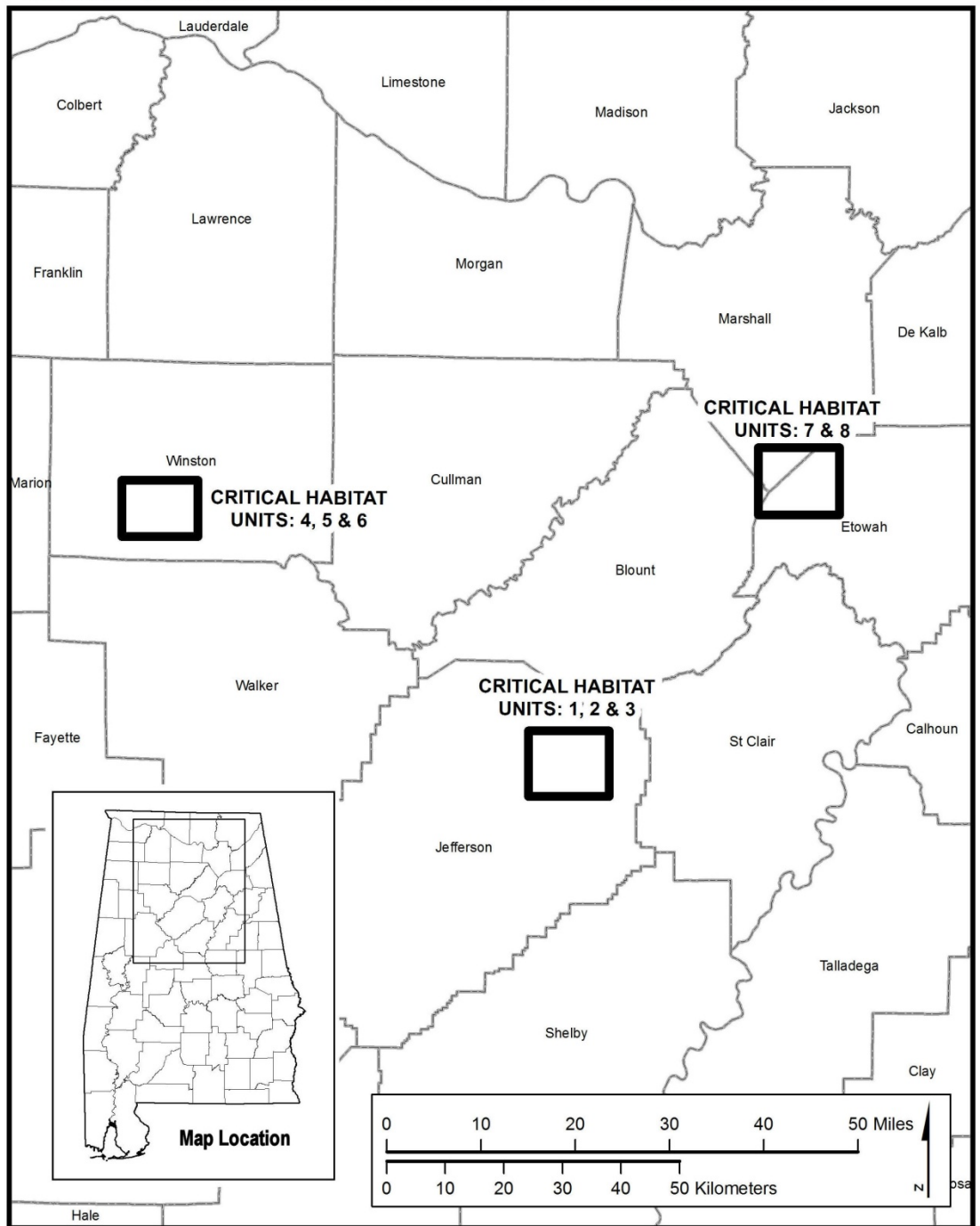
(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on **[INSERT DATE 30 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**.

(4) *Critical habitat map units.* Data layers defining map units were created on a base of USGS digital ortho-photo quarter-quadrangles, and critical habitat units were then mapped using Universal Transverse Mercator (UTM) Zone 16N, NAD1983, coordinates.

Upstream and downstream limits were then identified by longitude and latitude using decimal degrees and projected in WGS 1984. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the field office internet site (<http://www.fws.gov/cookeville>), <http://www.regulations.gov> at Docket No. FWS–R4–ES–2011–0074, and at the Service’s Tennessee Fish and Wildlife Office. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Index map follows:

## Overview of Critical Habitat Locations for the Rush Darter in Alabama



(6) Units 1, 2, and 3: Beaver Creek, Unnamed Tributary to Beaver Creek and Highway 79 Spring Site, and Tapawingo or Penny Spring and Spring Run, Jefferson County, Alabama.

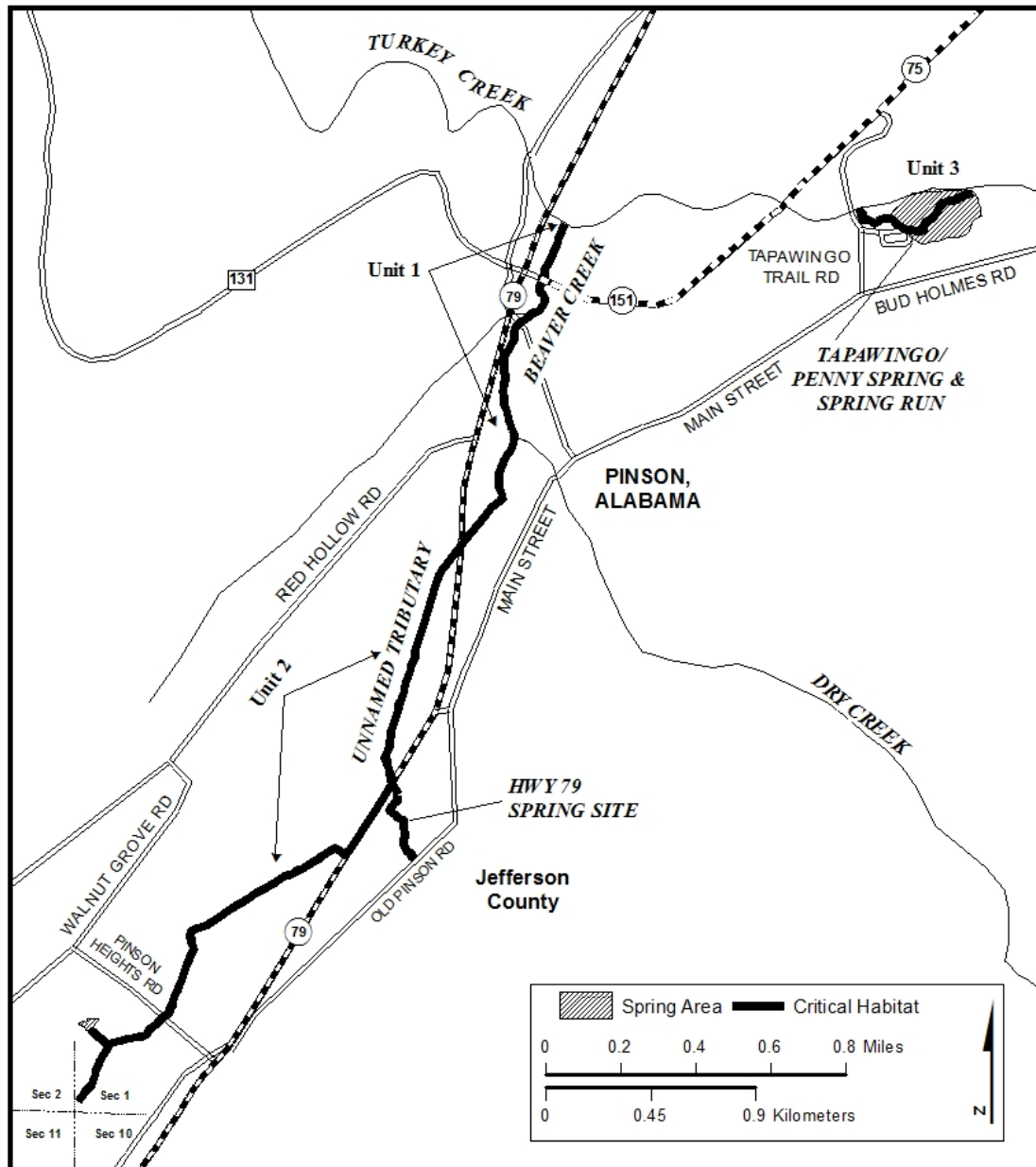
(i) Unit 1 includes 1.0 river kilometers (rkm) (0.6 river miles (rmi)) of Beaver Creek from the confluence with an unnamed tributary to Beaver Creek, downstream to the confluence with Turkey Creek.

(ii) Unit 2 includes 4.4 rkm (2.7 rmi) of an unnamed tributary of Beaver Creek and two spring runs. The site begins at the section 1 and 2 (T16S, R2W) line, as taken from the U.S. Geological Survey 7.5 topographical map (Pinson quadrangle), downstream to its confluence with Dry Creek, and includes a spring run beginning at the springhead just northwest of Old Pinson Road and intersecting with an unnamed tributary to Beaver Creek on the west side of Highway 79, and a spring associated wetland (0.13 ha, 0.33 ac) within the headwaters, south of Pinson Heights Road, flowing 0.9 km (0.05 mi) from the northwest (33.668173, -86.708577) and adjoining to the Unnamed Tributary (33.667344,-86.707429).

(iii) Unit 3 includes 0.6 rkm (0.4 rmi) of spring run, historically called Tapawingo Plunge, along with 6.7 ha (16.5 ac) of flooded spring basin making up Penny Springs, located south of Turkey Creek, north of Bud Holmes Road, east of Tapawingo Trail Road. The east boundary is at latitude 33° 41' 56.50"N and longitude 86° 39' 55.01"W: 1.0 km (0.6 mi) west of section line 28 and 29 (T15S, R1W) (U.S. Geological Survey 7.5 topographical map (Pinson quadrangle)).

(iv) Map of Units 1, 2, and 3 of critical habitat for the rush darter follows:

Map of Units 1 (Beaver Creek), 2 (unnamed tributary to Beaver Creek and Hwy 79 Spring Site) and 3 (Tapawingo or Penny Spring and Spring Run) of critical Habitat for the rush darter





(7) Units 4, 5, and 6: Wildcat Branch, Mill Creek, and Doe Branch, Winston County, Alabama.

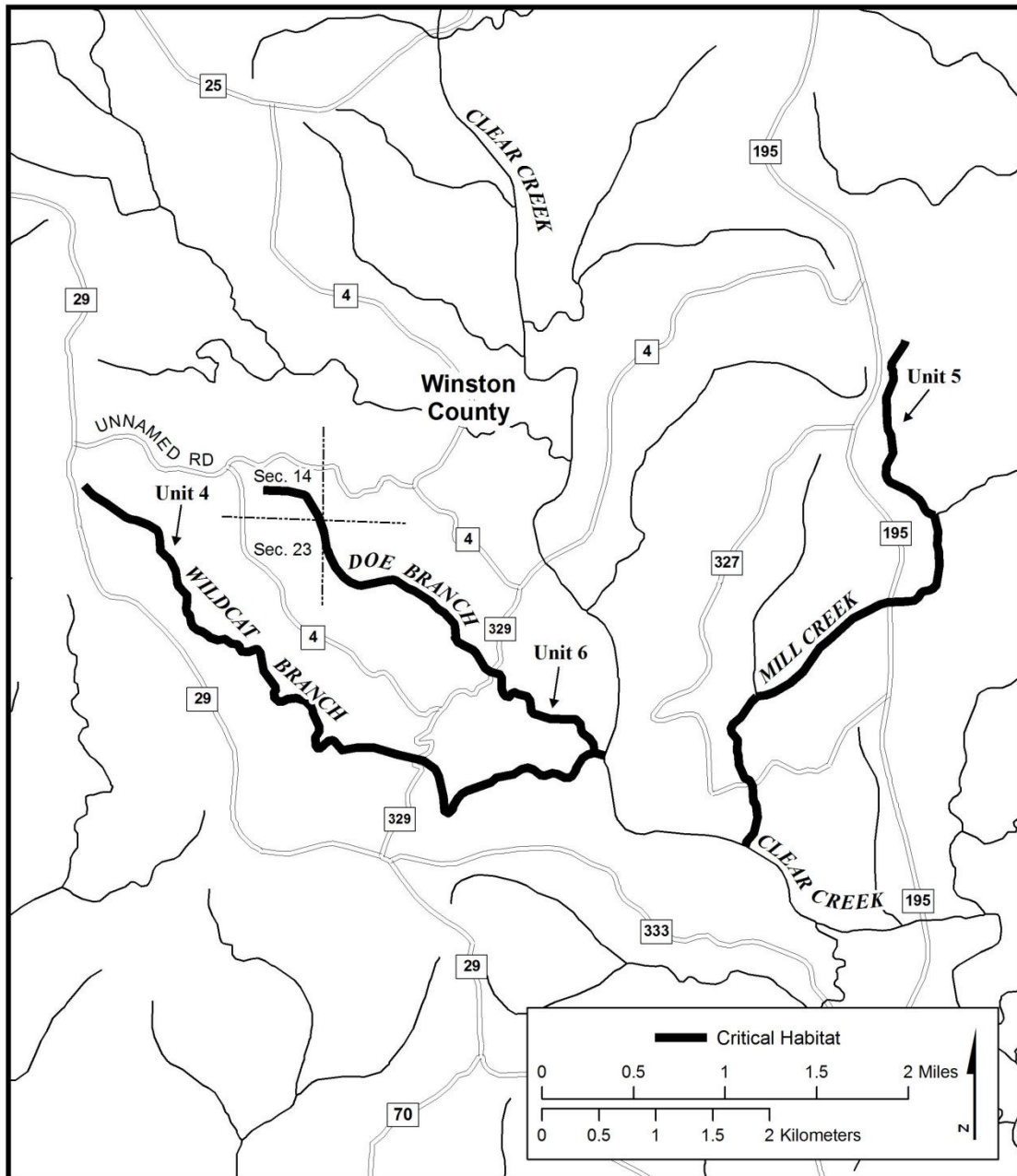
(i) Unit 4 includes 6.6 rkm (4.1 rmi) of Wildcat Branch from the streams headwaters just east of Winston County Road 29 to the confluence with Clear Creek.

(ii) Unit 5 includes 5.9 rkm (3.7 rmi) of Mill Creek from the streams headwaters just east of Winston County Road 195 to the confluence with Clear Creek.

(iii) Unit 6 includes 4.3 rkm (2.7 rmi) of Doe Branch from the streams headwaters north and west of section line 23 and 14 (R9W, T11S; Popular Springs Quadrangle) to the confluence with Wildcat Branch.

(iv) Map of Units 4, 5, and 6 of critical habitat for the rush darter follows:

**Map of Units 4 (Wildcat Branch), 5 (Mill Creek) and 6 (Doe Branch)  
of critical habitat for the rush darter**



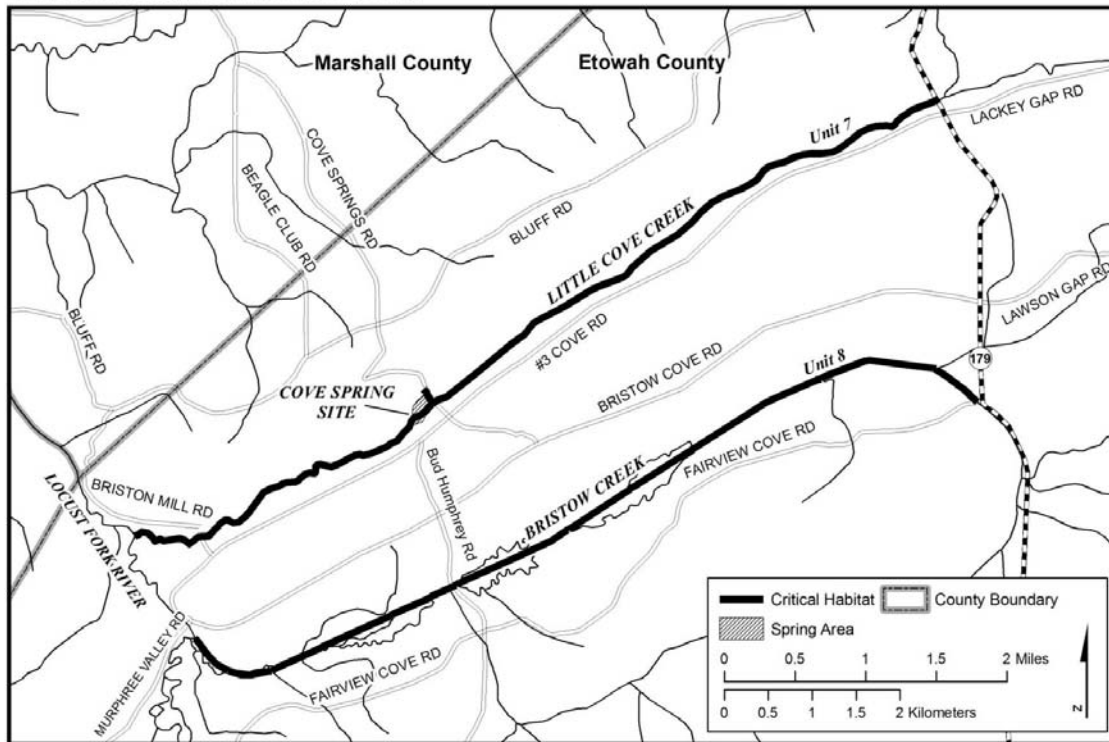
(8) Units 7 and 8: Little Cove Creek, Cove Spring and Spring Run; and Bristow Creek, Etowah County, Alabama.

(i) Unit 7 includes 11.2 rkm (6.1 rmi) of Little Cove Creek and the Cove Spring run system along with 5.1 ha (12.7 ac) of the spring run floodplain. Specifically, the Little Cove Creek section (11.0 rkm (6.0 rmi)) is from the intersection of Etowah County Road 179 near the creek headwaters, downstream to its confluence with the Locust Fork River. The Cove Spring and spring run section includes 0.2 rkm (0.1 rmi) of the spring run from the springhead at the West Etowah Water and Fire Authority pumping station on Cove Spring Road to the confluence with Little Cove Creek and includes 5.1 ha (12.7 acres) of the spring run floodplain due south of the pumping facility.

(ii) Unit 8 includes 10.2 rkm (6.3 rmi) of Bristow Creek beginning from the bridge at Fairview Cove Road, downstream to the confluence with the Locust Fork River.

(iii) Map of Units 7 and 8 of critical habitat for the rush darter follows:

**Map of Units 7 (Little Cove Creek, Cove Spring Site) and 8 (Bristow Creek) of critical habitat for the rush darter**



\* \* \* \* \*

Yellowcheek darter (*Etheostoma moorei*)

(1) Critical habitat units are depicted for Cleburne, Searcy, Stone, and Van Buren Counties, Arkansas, on the maps below.

(2) Within these areas, the primary constituent elements of the physical and biological features essential to the conservation of the yellowcheek darter consist of five components:

(i) Geomorphically stable, second- to fifth-order streams with riffle habitats, and connectivity between spawning, foraging, and resting sites to promote gene flow within the species' range where possible.

(ii) Stable bottom composed of relatively silt-free, moderate to strong velocity riffles with gravel, cobble, and boulder substrates.

(iii) An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(iv) Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the yellowcheek darter.

(v) Prey base of aquatic macroinvertebrates, including blackfly larvae, stonefly larvae, mayfly nymphs, and caddisfly larvae.

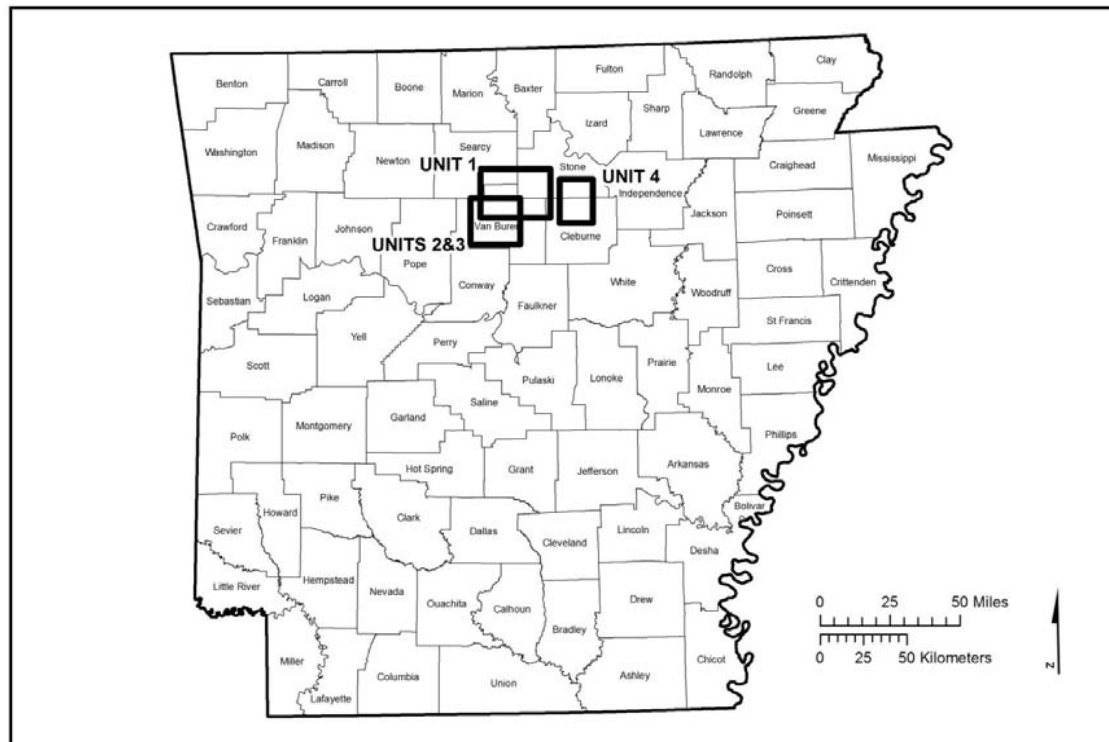
(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on **[INSERT DATE 30 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**.

(4) *Critical habitat unit maps.* Data layers defining map units were created on a base of USGS digital ortho-photo quarter-quadrangles, and critical habitat units were then mapped using Universal Transverse Mercator (UTM) Zone 15N, NAD1983, coordinates. Upstream and downstream limits were then identified by longitude and latitude using decimal degrees and projected in WGS 1984. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the field office internet site (<http://www.fws.gov/cookeville>), <http://www.regulations.gov> at Docket No. FWS-R4-ES-2011-0074, and at the Service's Tennessee Fish and Wildlife Office. You may obtain field office location information by

contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Index map follows:

## Overview of Critical Habitat Locations for Yellowcheek darter in Arkansas



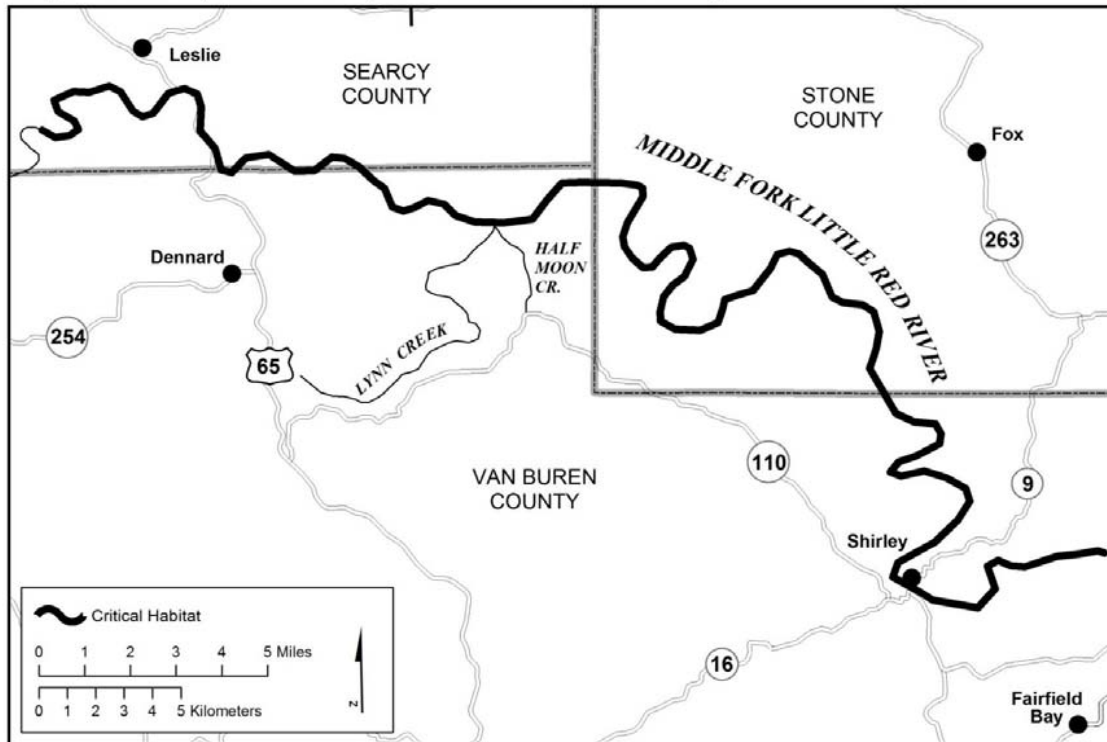


(6) Unit 1: Middle Fork Little Red River; Searcy, Stone and Van Buren Counties, Arkansas.

(i) Unit 1 includes 73.2 river kilometers (rkm) (45.5 river miles (rmi)) of the Middle Fork of the Little Red River from Searcy County Road 167 approximately 3.4 rkm (2.1 rmi) southwest of Leslie, Arkansas, to a point on the stream 7.7 rkm (4.8 rmi) downstream of the Arkansas Highway 9 crossing of the Middle Fork near Shirley, Arkansas.

(ii) Map of Unit 1 of critical habitat for the yellowcheek darter follows:

Map of Unit 1 (Middle Fork) of critical habitat for the yellowcheek darter

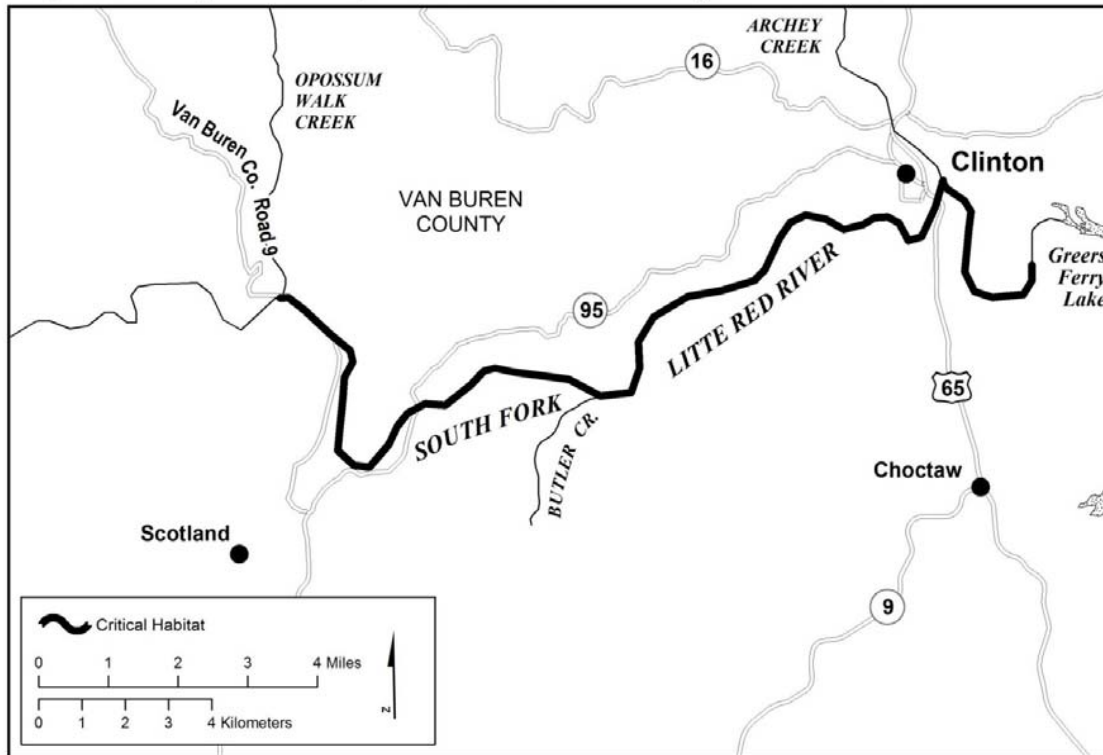


(7) Unit 2: South Fork Little Red River; Van Buren County, Arkansas.

(i) Unit 2 includes 33.8 rkm (21.0 rmi) of the South Fork of the Little Red River from Van Buren County Road 9 three miles north of Scotland, Arkansas, to a point on the stream approximately 5.5 rkm (3.4 rmi) downstream of U.S. Highway 65 in Clinton, Arkansas, where it becomes inundated by Greers Ferry Lake.

(ii) Map of Unit 2 of critical habitat for the yellowcheek darter follows:

Map of Unit 2 (South Fork) of critical habitat for the yellowcheek darter

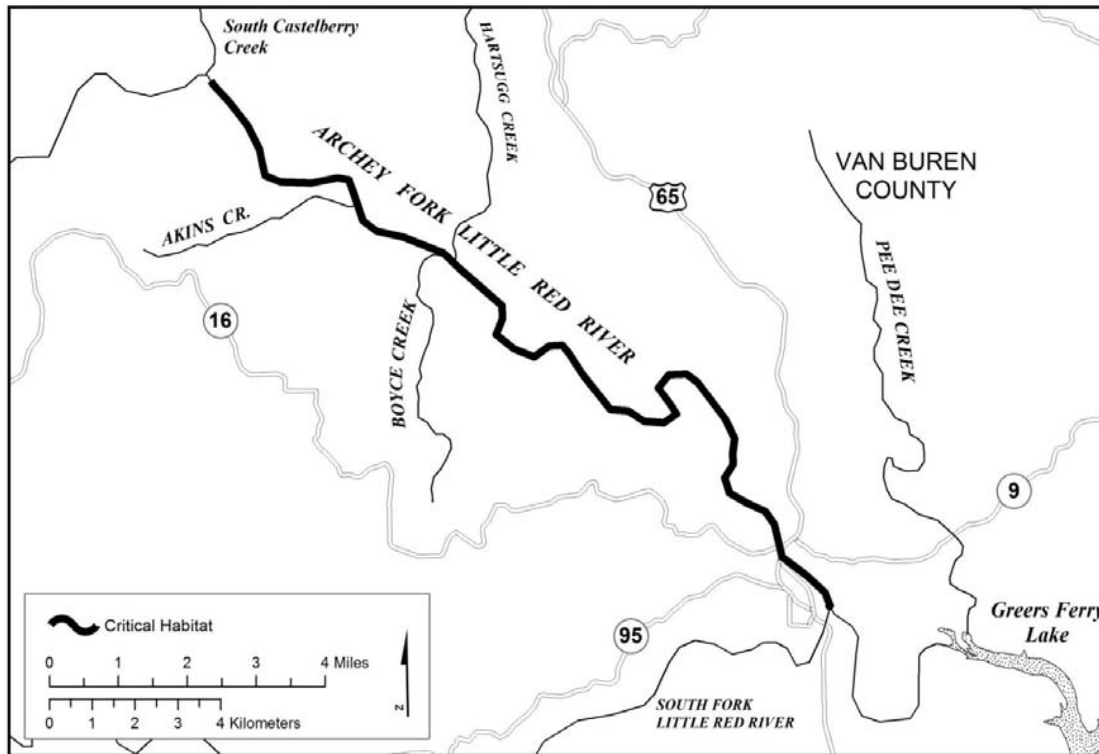


(8) Unit 3: Archey Fork Little Red River; Van Buren County, Arkansas.

(i) Unit 3 includes 28.5 rkm (17.7 rmi) of the Archey Fork of the Little Red River from its confluence with South Castleberry Creek to its confluence with the South Fork of the Little Red River near Clinton, Arkansas.

(ii) Map of Unit 3 of critical habitat for the yellowcheek darter follows:

Map of Unit 3 (Archey Fork) of critical habitat for the yellowcheek darter

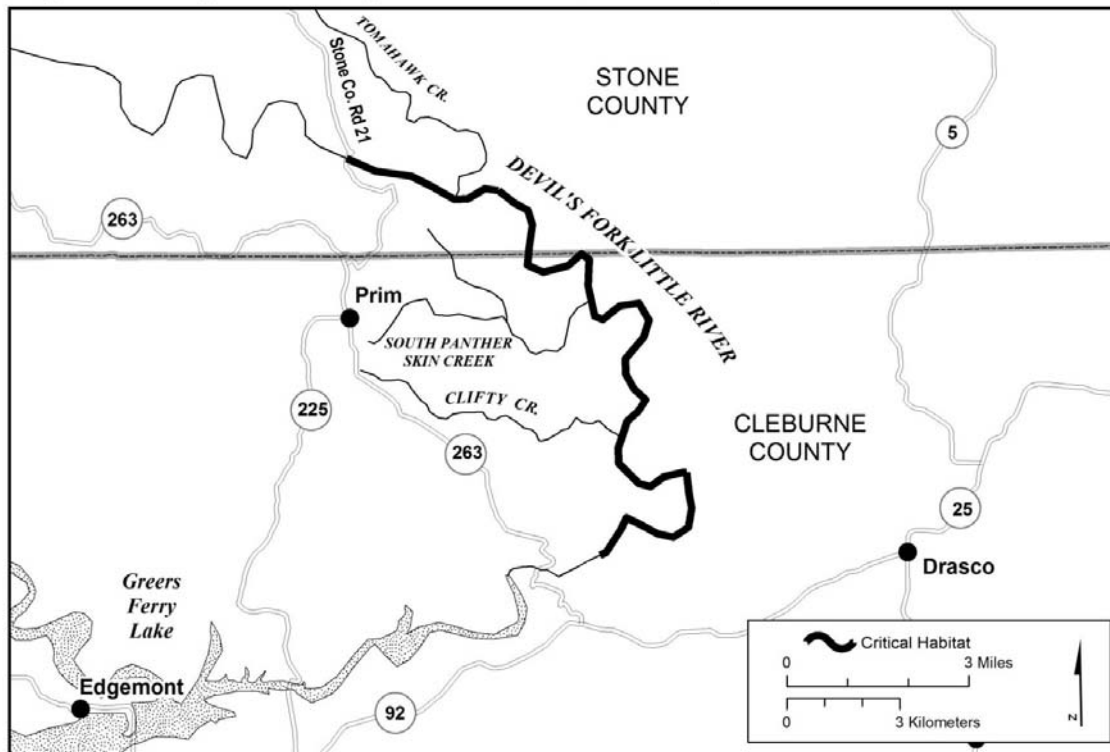


(9) Unit 4: Devil's Fork Little Red River (including Turkey Creek and Beech Fork); Cleburne and Stone Counties, Arkansas.

(i) Unit 4 includes 28.0 rkm (17.4 rmi) of stream from Stone County Road 21 approximately 3 miles north of Prim, Arkansas, to a point on the Devil's Fork approximately 5.1 km (3.2 mi) southeast of Woodrow, Arkansas, at the point of inundation by Greers Ferry Lake.

(ii) Map of Unit 4 of critical habitat for the yellowcheek darter follows:

Map of Unit 4 (Devil's Fork) of critical habitat for the yellowcheek darter





\* \* \* \* \*

Chucky Madtom (*Noturus crypticus*)

(1) The critical habitat unit is depicted for Greene County, Tennessee, on the maps below.

(2) Within this area, the primary constituent elements of the physical and biological features essential to the conservation of the Chucky madtom consist of five components:

(i) Gently flowing run and pool reaches of geomorphically stable streams with cool, clean, flowing water; shallow depths; and connectivity between spawning, foraging, and resting sites to promote gene flow throughout the species' range.

(ii) Stable bottom substrates composed of relatively silt-free, flat gravel, cobble, and slab-rock boulders.

(iii) An instream flow regime (magnitude, frequency, duration, and seasonality of discharge over time) sufficient to provide permanent surface flows, as measured during years with average rainfall, and to maintain benthic habitats utilized by the species.

(iv) Adequate water quality characterized by moderate stream temperatures, acceptable dissolved oxygen concentrations, moderate pH, and low levels of pollutants. Adequate water quality is defined for the purpose of this rule as the quality necessary for normal behavior, growth, and viability of all life stages of the Chucky madtom.

(v) Prey base of aquatic macroinvertebrates, including midge larvae, mayfly nymphs, caddisfly larvae, and stonefly larvae.

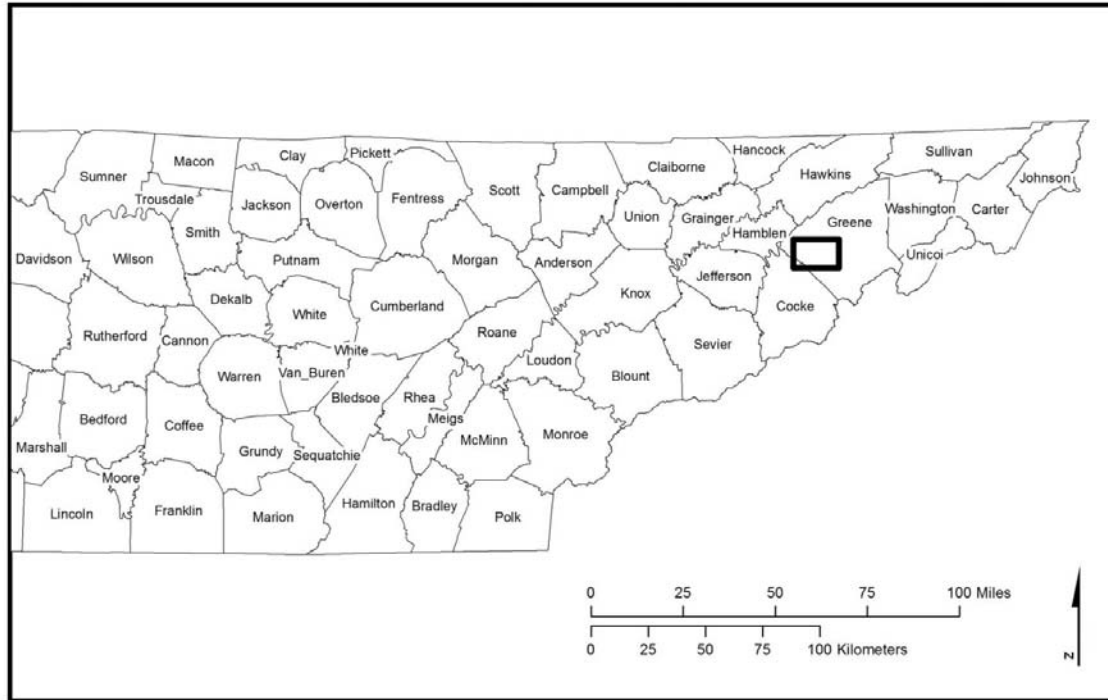
(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on **[INSERT DATE 30 DAYS AFTER DATE OF FEDERAL REGISTER PUBLICATION]**.

(4) *Critical habitat unit maps.* Data layers defining map units were created on a base of USGS digital ortho-photo quarter-quadrangles, and critical habitat units were then mapped using Tennessee State Plane, Lambert Conformal Conic Projection, units feet. Upstream and downstream limits were then identified by longitude and latitude using decimal degrees and projected in WGS 1984. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at the field office internet site (<http://www.fws.gov/cookeville>), <http://www.regulations.gov> at Docket No. FWS-R4-ES-2011-0074, and at the Service's Tennessee Fish and Wildlife Office. You may obtain field office location information by

contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Index map follows:

## Overview of Critical Habitat Locations for the Chucky Madtom in Tennessee

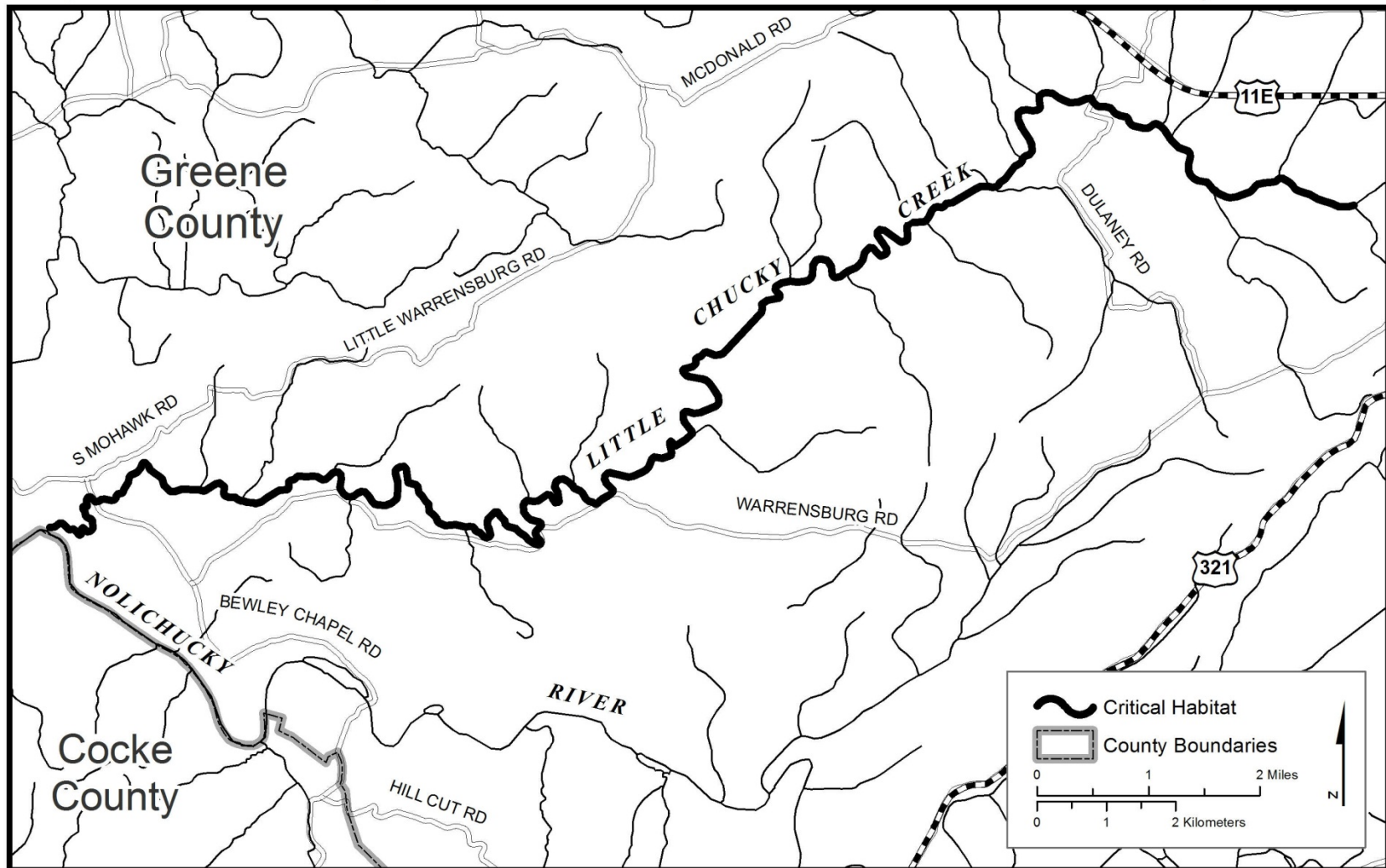


(6) Little Chucky Creek Unit, Greene County, Tennessee.

(i) Little Chucky Creek Unit includes 31.9 river kilometers (19.8 river miles) of Little Chucky Creek from its confluence with an unnamed tributary, downstream to its confluence with the Nolichucky River, at the Greene and Cocke County line, Tennessee.

(ii) Map of Little Chucky Creek Unit of critical habitat for the Chucky madtom follows:

Map of Little Chucky Creek Unit of critical habitat for the Chucky madtom



\* \* \* \* \*

Dated: September 25, 2012

Rachel Jacobson

Principal Deputy Assistant Secretary for Fish and Wildlife and Parks

**Billing Code 4310-55-P**

[FR Doc. 2012-24468 Filed 10/15/2012 at 8:45 am; Publication Date: 10/16/2012]